

NOTES ON SEDIMENTATION ACTIVITIES CALENDAR YEAR 1979

A Report of the

Subcommittee on Sedimentation

Interagency Advisory Committee on Water Data

Prepared By

U.S. Department of the Interior, Geological Survey
U.S. Department of Agriculture, Soil Conservation Service

Office of Water Data Coordination

Reston, Virginia 22092

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PREFACE

The need for disseminating current information on activities in the field of sedimentation was proposed by the chairman of the Federal Interagency River Basin Committee's Subcommittee on Sedimentation shortly after the subcommittee was formed in May 1946. At the fifth meeting of the subcommittee on September 17, 1946, the members approved this proposal and agreed to the issuance of a quarterly report as one means of effecting better coordination of the work of various Federal Agencies in the field of sedimentation.

Quarterly reports were issued during the period of July 1, 1946, through June 30, 1947, when the reporting period was changed to a 6-month period, and semiannual reports were issued through 1953. Starting in 1954 and continuing through the present, these reports have been made annually and cover the activities of the Federal Agencies in the field of sedimentation on a calendar-year basis.

This report is a digest of information furnished by Federal Agencies on sedimentation investigations, both ongoing and planned. Included in the report are a review of important findings, new methodologies, new publications, laboratory and other research activities, and other pertinent information. The material is organized on the basis of the 21 water resources regions delineated by the U.S. Water Resources Council (WRC) for use in the national assessment (see figure 1). A listing by WRC region of stations at which sediment data have been obtained is given in table 3 of the appendix. Within each region, the stations are arranged according to their 8-digit hydrologic unit code. Stations for which the hydrologic unit code was not available are given at the end of the listing under "Miscellaneous." Also given in the appendix is an explanation of the column headings in the station listings, the code number and abbreviations used for State, county, and other areas (table 1), and the code for each organization reporting activities in this volume (table 2).

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DEPARTMENT OF AGRICULTURE

* Forest Service

* Science and Education Administration

*Soil Conservation Service

DEPARTMENT OF THE ARMY *Corps of Engineers

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

DEPARTMENT OF ENERGY
Federal Energy Regulatory Commission

DEPARTMENT OF THE INTERIOR
Bureau of Mines
*Bureau of Reclamation
*Geological Survey

DEPARTMENT OF TRANSPORTATION *Federal Highway Administration

*TENNESSEE VALLEY AUTHORITY

*Participating agencies in "Notes on Sedimentation Activities"

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NEW ENGLAND REGION

CORPS OF ENGINEERS

New England Division

Report on sedimentation and erosion activities in the New England Division is as follows:

- 1. Black Rock Lake, Connecticut. Reforestation efforts are now complete (11,000 seedlings) on a large borrow area which has been the major contributor to lake sedimentation. Since 1975, 7500 c.y. of sediment have been removed. This reforestation project is expected to greatly reduce the sediment problem, however, one additional silt removal action will be budgeted for in FY 84.
- 2. Northfield Brook Lake, Connecticut. A fall 1980 (FY 81) drawdown is planned for the removal of 3600 c.y. of sediment from the 8-acre lake. Sources contributing to this sediment problem have declined to a negligible rate, and it is anticipated that this planned removal should be the last for at least ten years.
- 3. Hop Brook Lake, Connecticut. A complete approach to sediment and water quality problems at Hop Brook's 21-acre lake has been implemented to reduce sediment, improve the water resource, fishery and recreational value: Under the provisions of a contract awarded in FY 79, covering the sale of 160,000 c.y. of sand and gravel, the buyer commenced work on a three year, overall deepening and lake bed restructuring project to our specifications. At the end of this, the second season, approximately 90,000 c.y. of sand and gravel have been removed.
- 4. North Hartland Lake, Vermont. The feasibility of removing silt which has accumulated along lakeshore areas as a result of bank slumping is still being considered. The planting of vegetation to halt erosion and further slumping is scheduled for this spring.
- 5. North Springfield Lake, Vermont. Sedimentation at the confluence of the Black River's North Branch and the recreation pool at Stoughton Pond will be removed after a plan for draining the pool is finalized. The ogee weir that serves as the pool's outlet must be modified. Routine maintenance may then be applied to the silt removal.
- 6. Otter Brook Lake, New Hampshire. A continuing silt removal project of approximately 1500 c.y. will be performed this year, to maintain a desirable current pattern that will help to keep the bathing area clean.
- 7. Townshend Lake, Vermont. Annual silt removal is budgeted for accumulations around the beach area. Debris removal from below the log boom is scheduled for FY 82. Accumulations around the boat ramp are being studied for possible removal through sale or contract.

8. <u>Littleville Lake, Massachusetts</u>. Sedimentation along the channel from the Dayville Boat Ramp to the lake has not yet been removed. An estimated 45,000 c.y. of sediment have filled the 300 to 400 foot long, 50 foot wide channel to a depth of 3 feet. Turbidity and boating problems have resulted. Budget request has been submitted for approval for FY 82 removal.

NEW ENGLAND REGION

GEOLOGICAL SURVEY

St. John Subregion

1. Suspended-sediment data are being collected on a monthly basis at Aroostoo River at Caribou, Maine, and at St. John River near Van Buren, Maine, as a part of the National Stream Quality Accounting Network (NASQAN).

Penobscot Subregion

1. Suspended-sediment data are being collected on a monthly basis at Penobscot River at Eddington, Maine, (relocated from West Enfield) as a part of NASQAN.

Androscoggin Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Kennebec River near North Sidney, Maine, (relocated from Bingham) and at Androscoggin River at Brunswick, Maine, as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis for the U.S. Corps of Engineers at Wild River at Gilead, Maine, as a part of the National Hydrologic Benchmark Network.

Maine Coastal Subregion

1. Suspended-sediment data are being collected on a monthly basis at St. Croix River at Milltown, Maine, and at Narraguagus River at Cherryfield, Maine, as a part of NASQAN.

Saco Subregion

1. Suspended-sediment data are being collected on a monthly basis at Saco River at Cornish, Maine, and at Presumpscot River near West Falmouth, Maine, as a part of NASQAN.

Merrimack Subregion

1. Suspended-sediment data are being collected on a monthly basis at Merrimack River above Lowell, Mass., as a part of NASQAN.

Connecticut Subregion

1. Suspended-sediment data are being collected on a monthly basis at Connecticut River at North Walpole, N.H., and at Connecticut River at Thompsonville, Conn., as a part of NASQAN.

Massachusetts-Rhode Island Coastal Subregion

1. Suspended-sediment data are being collected on a monthly basis at Charles River at Dover, Mass., Blackstone River at Millville, Maine, and at Pawcatuck River at Westerly, R.I., as a part of NASQAN.

Connecticut Coastal Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at B^{T} ack River at Coventry, Vt., Housatonic River at Stevenson, Conn., Shetucket River at South Windham, Conn., and at Quinebaug River at Jewett City, Conn. as a part of NASOAN.
- 2. Suspended-sedient data are being collected on approximately a daily basis at Yantic River at Yantic, Conn., to determine daily sediment loads.

Special Studies

1. Sediment data are being collected on approximately a daily basis at Housatonic River at Great Barrington, Mass., Housatonic River at Falls Village, Conn., and Housatonic River at Gaylordsville, Conn., as part of a study to determine the quantity, distribution, and method of transport of PCB in the Housatonic River. The study is being done in cooperation with the State of Connecticut Department of Environmental Protection.

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD U.S. Geological Survey 135 High Street, Room 235 Hartford, CT 06103

District Chief, WRD U.S. Geological Survey 150 Causeway Street, Suite 1001 Boston, MA 02114

NEW ENGLAND REGION

SOIL CONSERVATION SERVICE

1. Studies of sediment damages and determinations of sediment yields were made for work plans in the following watersheds:

a. River Basin Investigations

- (1) SCS-Maine, in cooperation with the Statewide USDA 208 committee, completed a "Study of Non-point Agricultural Pollution" (SNAP) to identify: the location, extent, and kind of agricultural practices causing soil erosion. One phase of this study included computation of soil erosion rates on all cropland fields over 10 acres in size in the state. A statewide summary report and individual reports for each of the state's 16 Soil and Water Conservation Districts were prepared.
- (2) SCS-Maine completed Phase I of the SCS National Erosion Inventory, which was an inventory of land use and sheet and rill erosion rates. Results of this inventory were published in August 1979, in "A Profile of Maine's Soil and Water Resources from the National Resources Inventories, 1977, Phase I, Land and Use and Sheet and Rill Erosion."
- (3) Field work was completed and data was submitted for Phase II of the above inventory, which covered gully, streambank, construction site, and road bank erosion. Results are expected to be published in 1980.

2. Reservoir Sediment Deposition Surveys

- a. A sedimentation survey was conducted on a multi-purpose PL-566 reservoir, Violette Brook Site 2, Van Buren, Aroostook County, Maine in June 1979. The original survey was done in 1974. Sediment accumulations have not yet been computed.
- b. Original capacity computations were made on the Presque Isle Stream Site 7, Hanson Lake, Aroostook County, Maine in October 1979.
- c. A reservoir sedimentation survey was made on the Lake Kennedy-Forest City RAMP Project in Susquehanna County Pennsylvania.
- d. A reservoir sedimentation survey was made on Furnace Brook-Site #2 in Warren County, New Jersey.

MID ATLANTIC REGION

CORPS OF ENGINEERS

North Atlantic Division

Baltimore District

The following data are on accumulated sediment, collected during 1979. The data are records of the material removed during routine maintenance of flood control projects.

Project Location	Stream	Sediment Removal	Sediment Removed During 1979 (CU YDS)
Almond Dam, NY	Canacadea Cr.	Rt. 21 Br.	1,500
Arkport Dam, NY	Canisteo River	Intake channel	4,201
Binghampton, NY	Pierce Creek	Channel above paved channel	1,950
		Belden Street drop structure and channel below	1,190
Canisteo, NY	Purdy Creek	Check Dam	5,294
		Confluence with Bennett Creek	2,485
Corning, NY	Cutler Creek	Above upper drop structure	1,272
Hornell, NY	Chauncey Run	Check dams	600
	Canisteo River	Downstream of paved channel and Cedar Street	448
	Crosby Creek	Check dam & channel above	4,164
		At confluence with Canisteo River	296
Lisle, NY	Dudley Creek and Tioughnioga River	Channel at confluence	1,790
Whitney Point, NY	Tioughnioga River	Channel	5,254

New York District

The District Conducted sediment tests at the following locations:

Project Name	Bioassay**	<u>Bioaccumulation</u>	Grain Size
Gowanus Creek Channel*	x	X	x
Westchester Creek*	X	X	X
Newtown Creek*	X	X	X
Newark Bay*	X	X	X
Mamaroneck Harbor#	X	X	X
Passaic River	X	X	X
Bronx River*	X	X	X
Edgewater - Weehawken#	X	X	X
Dutch Kills#	X	X	X
Raritan River - N*	X	X	X
Raritan River - S#	X	X	X
Raritan Bay#	X	X	X
Raritan River Cutoff*	X	X	X
Kill Van Kull#	X	X	X
Sandy Hook Bay*	X	X	X
Sandy Hook Leonardo*	X	X	X
N. Shooters Is.*	X	X	X
Red Hook Anchorage*	X	X	X

^{*}Navigation Project

**The bioassay of appropriate sensitive marine organisms can be used as an aid in evaluating the importance of dissolved chemical constituents released from the sediment during disposal operations. This procedure can also be used to evaluate the effect of suspended particulate matter that is present in the water column for certain periods of time during disposal of dredged material. A series of experimental treatments and controls are established using the liquid phase or suspended particulate phase of the dredged material and disposal site water. The test organisms are added to the test chambers and incubated under standard conditions for a prescribed period of time. The surviving organisms are examined at appropriate intervals to determine if the test material is producing an effect.

Philadelphia District

District sedimentation activities during 1979 were as follows:

- 1. Continued financial support of the United States Geological Survey for the collection of sediment data at:
 - (a) Delaware River at Trenton, New Jersey.
 - (b) Schuylkill River at Berne, Pennsylvania.

- (c) Schuylkill River at Philadelphia, Pennsylvania.
- (d) Tulpehocken Creek at Blue Marsh Damsite Post-Impoundment Studies.
- 2. Up-dated Sediment Surveys of District Reservoir projects:
- (a) Prompton Lake.
- (b) Beltzville Lake.
- 3. Initial Sediment Survey Range lines at Blue Marsh Lake (setting of baseline conditions).

MID ATLANTIC REGION

GEOLOGICAL SURVEY

Richelieu Subregion

1. Suspended-sediment data are being collected on a periodic basis at Richelieu River (Lake Champlain) at Rouses Point, N.Y., as a part of the National Stream Quality Accounting Network (NASQAN).

Upper Hudson Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Hudson River at Stillwater, N.Y., and Hudson River at Waterford, N.Y., in cooperation with the New York State Department of Environmental Conservation. Sediment data collected on a daily basis at Mohawk River at Cohoes, N.Y., was discontinued September 30, 1979. Collection of sediment data at Hudson River at Rogers Island at Ft. Edward, N.Y., and Hudson River at Schuylerville, N.Y., was reduced from daily to periodic basis on September 30, 1979.
- 2. Suspended-sediment data are being collected on a periodic basis at Hudson River at Glens Falls, N.Y., in cooperation with the New York State Department of Environmental Conservation (discontinued September 30, 1979).
- 3. Suspended-sediment data are being collected on a periodic basis at Hudson River at Green Island, N.Y., as a part of NASQAN.
- 4. Suspended-sediment are being collected on a periodic basis at Esopus Creek at Shandaken, N.Y., as a part of the National Hydrologic Benchmark Network.
- 5. Suspended-sediment data are being collected on a periodic basis at Hudson River at Castleton-on-Hudson, N.Y., Hudson River at Catskill, N.Y., Hudson River at Staatsburg, N.Y., Hudson River at Clinton Point near New Hajburg, N.Y., and Hudson River at Highland Falls, N.Y., in cooperation with New York Department of Environmental Conservation.

Lower Hudson-Long Island Subregion

- 1. Suspended-sediment data are being collected at Passaic River at Little Falls, N.J., Raritan River near South Bound Brook, N.J., Peconic River at Riverhead, N.Y., Nissequoque River near Smithtown, N.Y., and at Carmans River at Yaphawk, N.Y., as a part of NASQAN.
- 2. Suspended-sediment data are being collected twice monthly at Passaic River at Singac, N.J., and Passaic River at Elmwood Park, N.J., as part of the Environmental Protection Agency's National Water Quality Surveillance System program.

Delaware Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Toms River near Toms River, N.J., Maurice River at Norman, N.J., and West Branch Wading River at Maxwell, N.J., and on a daily basis at Delaware River at Trenton, N.J., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at McDonalds Branch in Lebanon State Forest, N.J., as a part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected on a daily basis at Brandy-wine Creek at Wilmington, Del., in cooperation with the Delaware Geological Survey.
- 4. Suspended-sediment data are being collected on a daily basis at two sites on the Schuylkill River, Berne and Philadelphia (Manayunk), Pa. The data will be anaylzed by the U. S. Corps of Engineers to evaluate the Delaware River dredging programs. Sediment data are also being collected on a daily and storm basis on Schuylkill River near Landingville, Penn., to determine storm and daily sediment discharge rates.

Susquehanna Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Switzer Creek near Cohocton, N.Y., and with an automatic sampler to provide additional data during high flow. Data are collected in cooperation with the Suscuehana River Basin Commission.
- 2. Suspended-sediment data are being collected on a monthly and storm event basis at Young Womens Creek near Renovo, Penn., as part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected at Juniata River at Newport, Penn., as a Federal sediment index station.
- 4. Suspended-sediment data are being collected on a daily basis at Tioqa River at Lindley, N.Y., in cooperation with the U.S. Corps of Engineers.
- 5. Suspended-sediment data are being collected on a daily basis at Susquehanna River at Conowingo, Md., for the Environmental Protection Agency's Chesapeake Bay Program and as a part of NASOAN.

Upper Chesapeake Subregion

1. Suspended-sediment data are being collected on a montly basis at Chootank River near Greensboro, Md., and at Patuxent River near Bowie, Md., as a part of NASQAN.

Potomac Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at the following stations as part of the hydrologic assessment of the Eastern Coal Province:
 - a. North Branch Potomac River at Steyer, Md.
 - b. Savage River below Savage River Dam near Bloomington, Md.
 - c. Georges Creek at Franklin, Md.
 - d. North Branch Potomac River at Pinto, Md.
 - e. Wills Creek near Cumberland, Md.
- 2. Suspended-sediment data are being collected on a daily basis at North Branch Potomac River near Cumberland, Md., and at Monacacy River at Reichs Ford Bridge near Frederick, Md., in cooperation with the Maryland Geological Survey.
- 3. Suspended-sediment data are being collected on a daily basis at Conoco-cheague Creek at Fairview, Md., and at Potomac River at Point of Rocks, Md., as a part of the Federal CBR program.
- 4. Suspended-sediment data are being collected at Potomac River at Shepherds-town, W.Va., and Shenandoah River at Millville, W.Va., as a part of NASQAN.
- 5. Suspended-sediment data are being collected on a monthly basis at Lost River at McCauley near Baker, W. Va., for the U.S. Soil Conservation Service (discontinued September 30, 1979).
- 6. Suspended-sediment data are being collected on a monthly basis at North Fork of South Fork Potomac River at Cabin, W.Va., and at Abram Creek at Highway 50 Bridge near Mount Storm, W.Va., as part of the Coal Hydrology Program.
- 7. Suspended-sediment data are being collected on a daily basis at Potomac River at Chain Bridge, Washington, D.C., for the Environmental Protection Agency's Chesapeake Bay Program, and as part of NASQAN.

Lower Chesapeake Subregion

1. Suspended-sediment data are being collected on a daily basis on Rappahanock River at Remington, Va., as a Federal sediment index station.

Special Studies

1. A study of non-point sources of sediment, nutrients, and pesticides was started during the 1977 water year in the Pequea Creek Basin in Lancaster County, Pennsylvania. Data collection which continued through the 1978 water year includes the operation of an automatic suspended-sediment sampler on the Pequea Creek at Martic Forge. The study is in cooperation with the Susquehanna River Basin Commission, and has the support of the Chesapeake Bay Program.

- 2. Sediment data were collected during the 1978 and 1979 water years at three sites in Northern Pennsylvania. The data were collected as part of a study to evaluate the effects of surface mining operations on the Babb Creek basin. The study is in cooperation with USGS-OACR.
- 3. The basic suspended-sediment sampling network of 210 stations established by the New Jersey District is carried out in cooperation with the U.S. Corps of Engineers, N.J. Department of Environmental Protection, and the N.J. Department of Agriculture, Soil Conservation Service. Suspended-sediment samples are collected six to eight times a year.
- 4. Collection of sediment data was obtained at the Coastal Plain Index Station at Great Egg Harbor River at Folsom, N.J., normally at a frequency of twice weekly and twice daily during runoff conditions. This work is being done as part of the Federal CBR program to determine trends and the general hydrologic conditions.

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD U.S. Geological Survey Carroll Building, Room 208 8600 LaSalle Road Towson, MD 21204

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District Chief, WRD U.S. Geological Survey Post Office Box 1107 4th Floor, Federal Building 228 Walnut Street Harrisburg, PA 17108

SOUTH ATLANTIC-GULF REGION

CORPS OF ENGINEERS

South Atlantic Division

Charleston District

A sedimentation report for W. Kerr Scott Reservoir is being compiled by the Charleston District. All data has been gathered and computations have been made. The report is scheduled to be released during March 1980.

Jacksonville District

Suspended sediment measurements were made monthly on Rio Fajardo Basin in Puerto Rico.

Mobile District

Sedimentation Range Network Monitoring

- 1. The sedimentation range networks in the Demopolis and Gainesville Projects were resurveyed during the year. These projects are located on the Tombigbee River and are a part of the Tennessee-Tombigbee Waterway.
- 2. Complete network resurveys of the projects are made annually to provide data for a cooperative study that is being conducted by this office and the Waterways Experiment Station at Vicksburg, Mississippi.
- 3. In addition, resurveys of selected ranges are being conducted at 6 month intervals to supplement the data collected annually.

Sedimentation Design Memoranda

- 1. The sedimentation design memorandum for the Aberdeen Lock and Dam project was completed and approved on 17 September 1979.
- 2. Work has progressed during 1979 on the sedimentation design memorandum for the Canal Section Project. This memorandum is the fifth in a series of five for the Tennessee-Tombigbee Waterway.

Sedimentation Studies

- 1. The on-going study to determine the natural sedimentation characteristics of the Tibbee River and its tributaries continued through 1979 and probably will be completed in 1980.
- 2. The analysis to determine the erosion rates, deposition, and predicted future effects to six Alabama Power Company dams by the proposed construction of the Coosa River Waterway continued, but without much progress due to the limitation of man-hours available.

3. Plans were formulated to conduct a study of the lower Tombigbee and Alabama Rivers and the Mobile River Delta. This plan is being implemented in 1980 with emphasis on the sedimentation load being deposited in the delta and amount being passed into Mobile Bay.

Suspended Sediment Investigations

- 1. During the year data were collected on a daily basis from four locations, on the Tombigbee River, at Columbus, Aberdeen, Amory, and Fulton, Mississippi. Additionally, suspended sediment samples were obtained at about 5-week intervals at 20 stations located in the Tombigbee River basin. Three stations were discontinued during 1979 Tombigbee River above Columbus, MS, Town Creek above Amory, MS and Alabama River at Clairborne, AL. The 1978 report stated that this office discontinued the collection of data at three stations North Abbott and Trebloc on Houlka Creek and Mayhew on Catalpa Creek, however this function was resumed in 1979.
- 2. Progress is being made on installing permanent suspended sediment monitors on dams located in the Tenn-Tom Project area. It is anticipated that collection of data at 3 dams will begin in 1980 and will become part of the process for monitoring post-project sedimentation effects of the Tennessee-Tombigbee Waterway.

Savannah District

Core sediment samples were gathered in Hartwell and Clark Hill Lakes on 20-23 March 1979 and analyzed for iron, manganese, phosphorous, and mercury. A list of the sampling stations is as follows:

Chauga River at Highway 123 Keowee River at County Road 291 Twelve Mile Creek at Highway 15 Seneca River at Highway 93 Seneca River Between Martin Creek and Coneross Creek Tugaloo River at I-85 Seneca River at I-85 Twelve Mile Creek at I-85 Savannah River at Junction of Tugaloo and Seneca Rivers Savannah River at Richard B. Russell damsite Long Cane Creek at Highway 28 Savannah River at Highway 378 Little River at Highway 378 Broad River at Highway 77 Savannah River at Confluence with Fishing Creek Fishing Creek at Highway 77 Little River at Highway 47 Little River at Highway 43 Hart Creek near Big Hart Park Little River at Confluence with Kemp Creek Savannah River near Modoc, SC Savannah River at Confluence with Little River, GA

Sedimentation Surveys

- 1. John R. Kerr Dam and Reservoir, Roanoke River, VA and NC. The sedimentation ranges at Kerr were resurveyed during 1976 in order to determine the amount of storage lost to sedimentation since the last survey was made in 1959-60. Equipment used was a 17-foot fiberglass boat, a Raytheon Model 719-B Fathometer with narrow beam transducer, an Interspace Technology Model 412 Digitizer, a Systron-Donner Model 5103 digital printer and a Tellurometer Model CA-1000-D range meter. A report is drafted and will be finalized just as soon as higher priority work will permit. When adjustments are made in the reservoir capacity curve, the dependable capacity of the project will be redetermined and power sales contracts modified to reflect the new dependable capacity.
- 2. Philpott Lake, Smith River, VA. The sedimentation ranges at Philpott were resurveyed during 1976 in order to determine the amount of storage lost to sedimentation since the last resurvey was made in 1960. Equipment was the same as listed for John H. Kerr. Preparation of a final report on the resurvey is underway. The report should be completed in 1980. The dependable capacity of Philpott will be redetermined, if necessary, but not until both Kerr and Philpott can be redetermined together.
- 3. B. Everett Jordan Dam and Lake, Haw River, NC. In CY 1979 a system of 57 sedimentation ranges were established across the main body and tributaries of Jordan Lake (a new unfilled lake), extending upstream as far as the upper limits of the top of the flood control pool. Ranges were monumented and vertical and horizontal survey run. Objective of the system is to be able to periodically determine the amount of sediment deposits in the lake through resurveys.

Sediment Load Measurement. Two suspended sediment sampling stations (at Randolph, VA on Roanoke River and at Paces, VA on Dan River) upstream from John H. Kerr Reservoir were operated. The data (suspended sediment, particle size, chemical analysis and temperature) were used in connection with operation and maintenance of the reservoir.

SOUTH ATLANTIC-GULF REGION

GEOLOGICAL SURVEY

Chowan-Roanoke Subregion

- 1. Suspended-sediment data are being collected daily during flood events and at 7-day intervals for periods of medium to low flows at Dan River at Paces, Va., and at Roanoke River at Randolph, Va., in cooperation with the U.S. Corps of Engineers.
- 2. Suspended-sediment data are collected monthly at Roanoke River at Roanoke Rapids, N.C., as part of the National Stream Quality Accounting Network (NASQAN).

Neuse-Pamlico Subregion

- 1. Suspended-sediment data are being collected on a daily basis at the main station on the Chicod Creek and on a monthly basis at three sites in the Chicod Creek watershed near Grimesland, N.C., in cooperation with the U.S. Soil Conservation Service. Automatic sediment samplers were installed at two in-stream sediment traps to determine settling characteristics of the traps. Cross-sectional surveys of the traps were made immediately following major storms to determine the amounts of sediment deposited by high flows.
- 2. Suspended-sediment data are collected monthly at three sites as part of NASQAN.

Cape Fear Subregion

- 1. Suspended-sediment data are being collected at Black River at Dunn, N.C. to determine effects on stream characteristics by channel construction. This is being done in cooperation with the U.S. Corps of Engineers.
- 2. Suspended-sediment data are collected monthly on the Cape Fear River at Lock 1 as part of the NASQAN program.

Pee Dee Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Scape Ore Swamp near Bishopville, S.C., as a part of the National Hydrologic Benchmark Network.
- 2. Suspended-sediment data are being collected on a monthly basis at Lynches River at Effingham, S.C., Black River at Kingstree, S.C., Pee Dee River at Pee Dee, S.C., and at Pee Dee River near Rockingham, N.C., as a part of NASQAN.
- 3. Suspended-sediment data are being collected at the Yadkin River at Yadkin College, N.C., as a Federal Sediment Index Station.

Santee-Edisto Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Lakes Marion Moultrie Diversion Canal near Pineville, S.C., at Edisto River near Givhans, S.C., and at Coosawhatchie River near Hampton, S.C., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at Crawl Creek near Pineville, S.C., Santee River below St. Stephens, S.C. This is being done in cooperation with the U.S. Corps of Engineers.

Ogeechee-Savannah Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Upper Three Runs near New Ellenton, S.C., as a part of the National Hydrologic Benchmark Network.
- 2. Suspended-sediment data are being collected on a monthly basis at Savannah River near Clyo, Ga., and at Ogeechee River near Eden, Ga., as a part of NASQAN.
- 3. Suspended-sediment data are being collected on a periodic basis at Brier Creek near Wagesboro, Ga., in cooperation with the Georgia Geologic Survey.

Altamaha-St. Marys Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Falling Creek near Juliette, Ga., as a part of the National Hydrologic Benchmark Network.
- 2. Suspended-sediment data are being collected on a monthly basis at Altamaha River near Everett City, Ga., at Satilla River at Atkinson, Ga., and at one site in Florida as a part of NASQAN.
- 3. Suspended-sediment data are being collected at South River near McDonough, Ga., at Yellow River near Covington, Ga., at Pates Creek near Flippin, Ga., Ohoope River near Reidsville, Ga., Penholoway Creek near Jessup, Ga., and at Little Satilla River near Offerman, Ga., in cooperation with the Georgia Geologic Survey Division.

St. Johns Subregion

1. Suspended-sediment data are being collected on a periodic basis at three sites in Florida as a part of NASQAN.

Southern Florida Subregion

1. Suspended-sediment data are being collected on a periodic basis at seven sites in Florida as a part of NASQAN.

Peace-Tampa Bay Subregion

1. Suspended-sediment data are being collected on a periodic basis at five sites in Florida as a part of NASQAN.

Suwannee Subregion

1. Suspended-sediment data are being collected on a monthly basis at four sites in Florida as a part of NASQAN.

Ochlockonee Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at two sites in Florida as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a periodic basis at one site in Florida as a part of the National Hydrologic Benchmark Network.

Apalachicola Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at three sites in Florida as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a periodic basis at Chatta-hoochee River near Cornelia, Ga., at Sweetwater Creek near Austell, Ga., at Upatoi Creek near Columbus, Ga., in cooperation with the Georgia Geologic Survey.

Choctawhatchee-Escambia Subregion

1. Suspended-sediment data are being collected on a monthly basis at four sites in Florida as a part of NASQAN.

Alabama Subregion

- 1. Suspended-sediment data are being collected on a periodic basis at Coosawattee River near Ellijay, Ga., Holly Creek near Chatsworth, Ga., and West Armuchee Creek near Subligna, Ga., in cooperation with the Georgia Geologic Survey.
- 2. Suspended-sediment data are being collected in the Upper Coosa River basin at two sites on a monthly basis and at ten sites on a quarterly basis as part of the OSM Coal Hydrology study in Georgia.
- 3. Suspended-sediment data are being collected on a monthly basis at Alabama River at Montgomery, Ala., and at Alabama River at Claiborne, Ala., as a part of NASQAN.

Mobile-Tombigbee Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Tombigbea River at Gainesville, Ala., and at Tombigbee River at Coffeeville lock and dam, Ala., and at Black Warrior River below Warrior Dam near Eutaw, Ala., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at Sipsey Fork near Grayson, Ala., as a part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected by an automatic pumping sampler at Mackeys Creek near Dennis, Miss., in cooperation with the U.S. Corps of Engineers, to estimate the impact of sediment loads on the Tennessee-Tombigbee Waterway.

Pascagoula Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Pascagoula River near Benndale, Miss., and at Wolf Creek near Landon, Miss., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a bimonthly basis at Cypress Creek near Janice, Miss., as a part of the National Hydrologic Benchmark Network.

Pearl Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Pearl River near Bogulusa, La., as a part of the Federal CBR program.
- 2. Suspended-sediment data are being collected on a monthly basis at Bogue Chitto River near Bush, La., as a part of NASQAN.

Special Studies

- I. Suspended-sediment sampling by an automatic sampler was continued on Yellow Creek near Northport, Ala., and on Bear Creek near Samantha, Ala., as part of a study of coal-mine hydrology in cooperation with the Bureau of Land Management. Samples were collected monthly and during flood events at three additional sites in the Yellow Creek basin, one additional site in the Bear Creek basin, one site on Turkey Creek (Tuscaloosa County) near Tuscaloosa, Ala, and one site on Turkey Creek east of Samantha, Ala.
- 2. Suspended-sediment sampling by an automatic sampler was continued on Trinity Creek near Carbon Hill, Ala., and on Blue Creek near Oakman, Ala.
- 3. Suspended-sediment sampling during storm events was continued in two agricultural basins in southwest Georgia in conjunction with an ongoing study of the effects of agricultural runoff on receiving waters.

4. Suspended-sediment sampling by automatic pumping sampler was started on Dorsey Creek near Arkadelphia, Ala., on March 1, 1979.

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD U.S. Geological Survey P.O. Box V Oil and Gas Board Building Room 202 University, AL 35486

District Chief, WRD U.S. Geological Survey 325 John Knox Road, Suite F-240 Tallahassee, FL 32303

District Chief, WRD U.S. Geological Survey

6481 Peachtree Industrial Boulevard, Suite B Doraville, GA 30360

District Chief, WRD U.S. Geological Survey 100 W. Capitol St., Suite 710 Jackson, MS 39201

District Chief, WRD U.S. Geological Survey 2001 Assembly Street, Suite 200 Columbia, SC 29201 District Chief, WRD U.S. Geological Survey P.O. Box 66492 6554 Florida Boulevard Baton Rouge, LA 70896

District Chief, WRD U.S. Geological Survey P.O. Box 2857, Century Station Post Office Building Room 436 Raleigh, NC 27602

District Chief, WRD U.S. Geological Survey 200 West Grace Street, Room 304 Richmond, VA 23220

SOUTH ATLANTIC GULF REGION

SOIL CONSERVATION SERVICE

1. Studies of sediment damages and determinations of sediment yields were made for work plans and environmental statements for the following:

a. Public Law 566

Major Drainage	Watershed	Stream	County	State
Rocky River	Coddle-Coldwater Dutch Buffalo	Coddle-Coldwater Dutch Buffalo	Cabarrus	NC
Northeast Cape Fear River	Limestone-Muddy Crk	Limestone-Muddy Crk	Duplin	NC
Northeast Cape Fear River	Troublesome Crk	Troublesome Crk	Rockingham	NC
Lumber River	Moss Neck Crk	Moss Neck Crk	Robeson	NC
Choctawhatchee- Escambia	Upper Choctawhatchee	Wilkerson Crk	Coffee, Dale & Geneva	AL

b. River Basin Investigations

Major Basins	Basin Reported	State
Tar-Neuse	Tar-Neuse	NC
Yadkin-Pee Dee River	Yadkin-Pee Dee River	NC SC

2. Sedimentation Surveys

a. Sedimentation surveys are in progress on the following PL-566 watersheds:

Major Drainage	Str. No. & Watershed	Stream	County	State
Neuse River	#13-Bear Crk	Un-Named Trib of Bear Crk	Wayne	NC
Neuse River	#1-Crabtree Crk	Sirrup-Iron	Wake	NC
Yadkin River	#10-Dutchman Crk	Un-Named Trib of Cedar Crk	Davie	NC

Yadkin River	#16-Muddy Crk	South Fork of Muddy	McDowe11	NC
Yadkin River	#7A-Third Crk	Third Crk	Alexander	NC

A sediment deposition survey was completed on Twelve Mile Creek Watershed, Structure No. 12, Pickens County, South Carolina, during the evaluation period.

A reservoir sedimentation survey was performed at Lake Lahusage at the request of the Alabama Water Improvement Commission.

Major Drainage	Watershed	Stream	County	State
Upper Coosa	Little River	Little River	DeKalb Cherokee	AL

3. Other

Environmental assessments and sediment yield studies for operational projects:

Major Drainage	Watershed	Stream	County	<u>State</u>
Savannah River	Hudson River	Hudson River	Banks, Madison, & Franklin	GA n

GREAT LAKES REGION

CORPS OF ENGINEERS

North Central Division

Buffalo District

Lake Erie Wastewater Management Study. The Water Quality Section, formerly Lake Erie Wastewater Management Study, supported sample collection and analysis at nine streams during CY 79. Three of these, Broken Sword at Nevada, Sandusky River at Bucyrus, and Sandusky River at Upper Sandusky were discontinued at the end of FY 79. Three sampling stations were reestablished at the beginning of FY 80: Sandusky River at Mexico, E. Br. Wolf Creek at Bettsville, and W. Br. Wolf Creek at Bettsville.

Suspended solids is one of several parameters measured at the sampling stations. Other parameters are Total Phosphorus, Dissolved Ortho P, Nitrate and Nitrite Nitrogen, Ammonia, Silica, Chloride, Conductivity, Suspended Solids, Total Kjeldahl Nitrogen, Metals, and Pesticides. The sampling program consists of storm event sampling rather than continuous or periodic sampling at a regular interval. The hydrographs and chemographs obtained by event sampling are being used to verify and calibrate transport and watershed computer models.

Four additional stations will be established during CY 80 at selected watersheds within the Lake Erie drainage basin. These watersheds will be demonstration areas for reduced tillage and no-till farming practices. Results of event sampling will again be used to calibrate a watershed non-point source computer model.

Cuyahoga River Restoration Study. The Cuyahoga River Restoration Study, 3rd Interim Preliminary Feasibility Report on Erosion and Sedimentation was completed in late 1979. The results of the study indicated that the majority of natural sediment reaching the harbor is contributed by diffuse nonpoint sources of erosion (primarily sheet and rill erosion) from critically eroding areas in the upland watershed. Areas identified as critically eroding represent 24,000 acres or 16 percent of the total study area. The report also presented land management programs to control sheet and rill erosion on these critically eroding areas.

Streambank erosion was determined to contribute only a small percentage of the total volume of sediment dredged annually from Cleveland Harbor. Results of the streambank erosion studies are subject to verification in Stage 3 planning.

Buffalo District continues to collect flow and sediment discharge data from the sediment sampling station on the Cuyahoga River at Independence, OH.

Lorain Harbor, OH, Navigation Study. Laboratory analysis of bottom sediment samples collected from the navigation channel and upper turning basin during 1979 is being performed to determine the composition and gradation of the sediments. This information will be used to assess relative contribution of sediment from erosion and industrial discharge. Using a Ponar sampler, a total of 12 bottom sediment samples were collected.

Sediment density measurement by means of nuclear sediment density probe. In calendar year 1979, in-situ density measurements were updated in the following projects:

<u>City</u>	Project	No. of Measurements	<u>Date</u>
Cleveland, Ohio	Cuyahoga River	39	18-19 Mar 79
Fairport, Ohio	Grand River	5	20 Mar 79
Buffalo, NY	Buffalo River	23	30 May 79
Rochester, NY	Genesee River	8	1 Jun 79
Toledo, Ohio	Entrance Channel	. 13	28 Aug 79

Complete reports on these studies are available.

Detroit District

Periodic Sediment measurements of beach nourishment at:

Grand Haven, Michigan St. Joseph, Michigan Holland, Michigan Muskegon, Michigan

Sediment Study on Flint River at Vassar, Michigan for Flood Control Project. Seven points of sampling were done both at high flows and low flows. Determination of amount of sediment per day calculated. Work done for Corps by U.S.G.S. Data will be included in Flood Control Report for Vassar, Michigan.

GREAT LAKES REGION

GEOLOGICAL SURVEY

Western Lake Superior Subregion

- 1. Suspended-sediment data are being collected on a periodic and storm-event basis at Nemadji River Nr. South Superior, Wisc., at Bad River near Odanah, Wis., at Baptism River near Beaver Bay, Minn., and at St. Louis River at Scanlon, Minn., as a part of the National Stream Quality Accounting Network (NASQAN).
- 2. Suspended-sediment data are being collected on a daily basis by an automatic sampler at Deer Creek near Holyoke, Minn., in cooperation with the Minnesota Department of Natural Resources, Division of Waters.
- 3. Suspended-sediment measurements were made during floods at the following sites:

South Branch Partridge River near Babbitt, Minn-Partridge River above Colby Lake at Hoyt, Minn-Partridge River near Aurora, Minn-St. Louis River near Aurora, Minn-St. Louis River at Forbes, Minn-

Southern Lake Superior-Lake Superior Subregion

- 1. Suspended-sediment data are being collected on a intermittent basis at Washington Creek at Windigo (Isle Royale), Mich., as a part of the National Hydrologic Benchmark Network.
- 2. Suspended-sediment data are being collected on a monthly basis at Ontonagon River near Rockland, Mich., Sturgeon River near Chassell, Mich., and at Tahquamenon River near Tahquamenon, Mich., as a part of NASQAN.

Northwestern Lake Michigan Subregion

- 1. Suspended-sediment data are being collected on an intermittant basis at Popple River near Fence, Wis., as a part of the National Hydrologic Benchmark Network.
- 2. Suspended-sediment data are being collected on a periodic and storm-event basis at Fox River at Wrightstown, Wis., Ford River near Hyde, Mich., Escanaba River at Cornell, Mich., and at Menominee River near McAllister, Wis., as a part of NASQAN.

3. Suspended-sediment data are being collected on a periodic and storm-event basis for the State of Wisconsin at the following sites:

Highway 141 storm sewer at Green Bay, Wis. Halron Oil Company storm sewer at Green Bay, Wis. Beaver Dam Creek at Green Bay, Wis.

Southwestern Lake Michigan Subregion

- 1. Suspended-sediment data are being collected ona periodic and storm-event basis for the State of Wisconsin at the Onion River at Hingham, Wis., and at the Onion River near Sheboygan Falls, Wis.
- 2. Suspended-sediment data are being collected on a periodic and storm-event basis at Milwaukee River at Milwaukee, Wis., Manitowoc River at Manitowoc, Wis. and at Little Calumet River near McCool, Ind., as a part of NASQAN.
- 3. Suspended-sediment data are being collected at Trail Creek at Michigan City, Ind., and Galena River near LaPorte, Ind., for the State of Indiana.

Southeastern Lake Michigan Subregion

- 1. Suspended-sediment data are being collected on a weekly basis at Pigeon Creek near Angola, Ind., and at Little Elkhart River at Middleburg, Ind., for the State of Indiana.
- 2. Suspended-sediment data are being collected on an intermittent basis at North Branch Elkhart River at Cosperville, Ind., for the State of Indiana.
- 3. Suspended-sediment data are being collected on a monthly basis at Grand River at Eastmanville, Mich., St. Joseph River at Niles, Mich., and at Kalamazoo River at Saugatuck, Mich., as a part of NASQAN.

Northeastern Lake Michigan-Lake Michigan Subregion

1. Suspended-sediment data are being collected on a monthly basis at Manistique River above Manistique, Mich., at Muskegon River near Bridgeton, Mich., and at Manistee River at Manistee, Mich., as a part of NASQAN.

Northwestern Lake Huron Subregion

1. Suspended-sediment data are being collected on a monthly basis at Cheboygan River at Cheboygan, Mich., and Au Sable River near Au Sable, Mich., as a part of NASOAN.

Southwestern Lake Huron-Lake Huron Subregion

1. Suspended-sediment data are being collectd on a monthly basis at Pigeon River near Caseville, Mich., Thunder Bay River at Alpena, Mich., Rifle River near Sterling, Mich., and at Saginaw River at Saginaw, Mich., as a part of NASQAN.

St. Clair-Detroit River Subregion

1. Suspended-sediment data are being collected on a monthly basis at Clinton River at Mt. Clemons, Mich., Detroit River at Detroit, Mich., and at River Raisin near Monroe, Mich., as a part of NASQAN.

Western Lake Erie Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Maumee River at Waterville, Ohio, in cooperation with the U.S. Corps of Engineers, and at Sandusky River near Fremont, Ohio, in cooperation with the Ohio Department of National Resources.
- 2. Suspended-sediment data are being collected on an intermittant basis at Cedar Creek near Cedarville, Ind., in cooperation with the State of Indiana.

Southern Lake Erie Subregion

- 1. Suspended-sedimient data are being collected on a daily basis at Rock River near Berea, Ohio, and at Chagrin River at Willoughby, Ohio, for the Northeast Ohio Areawide Co-ordinating Agency, and at Cuyahoga River at Old Portage, Ohio, in cooperation with the Cuyahoga County Sanitary Engineering Department (discontinued September 30, 1979).
- 2. Suspended-sediment data are being collected on a daily basis at Cuyahoga River at Independence, Ohio, at Big Creek at Cleveland, Ohio, and Euclid Creek near Euclid, Ohio, in cooperation with the U.S. Corps of Engineers, Buffalo District.
- 3. Suspended-sediment data are being collected on a daily basis at Grand River at Painseville, Ohio, in cooperation with the Ohio Department of Natural Resources.

Eastern Lake Erie-Lake Erie Subregion

1. Suspended-sediment data are being collected on a periodic basis at Cattaraugas Creek at Gowanda, N.Y., 2nd Niagara River (Lake Ontario) at Ft. Niagara, N.Y., Tonawanda Creek at Batavia, N.Y., as a part of NASQAN.

Southwestern Lake Ontario Subregion

1. Suspended-sediment data are being collected on a periodic basis at Genesea River at Charlotte Docks at Rochester, N.Y., as a part of NASQAN.

Southeastern Lake Ontario Subregion

1. Suspended-sediment data are being collected on a periodic basis at Oswego River at Lock 7 at Oswego, N.Y., and at Sandy Creek at Adams, N.Y., as a part of NASQAN.

Northeastern Lake Onta

 Suspended-sediment data River at Watertown, N.Y., ' River at Brasher Center, No

Massena, N.Y., and at Oswer

NAS OAN.

For additional information

region, contact the follow

District Chief, WRD

U.S. Geological Survey

1819 North Meridian Street

OHIO REGION

CORPS OF ENGINEERS

Ohio River Division

Report on sedimentation activities in the Ohio River Division for calendar year 1979 is as follows:

Sedimentation Resurveys

- 1. Resurvey of Martins Fork Lake was completed in 1979. Analysis of the data shows that the amount of deposition was greater than the design rate. Work is scheduled for a second resurvey following this year's flood season, pending availability of operation and maintenance funds. If the rate of deposition is continuing to be greater than the design rate, a monitoring program to define sources of inflow may be initiated. Submission of the Resurvey Report is planned in March 1980.
- 2. Resurvey of Wolf Creek Reservoir was completed in 1979. Ranges are being analyzed to estimate the deposition volume and compare the actual rate of deposition against the design rate. If the actual rate is significantly greater, "spudding" additional ranges may be initiated. Submission of the Resurvey Report is planned in FY 80.
- 3. Fishtrap Lake, Levisa Fork, Kentucky: The report on the 1978 sedimentation survey was submitted to and approved by the Ohio River Division in 1979. The 1978 resurvey of 16 sediment ranges indicated an annual sedimentation rate of 2.52 acre-feet per square mile of contributing drainage area above Fishtrap Lake for the period September 1975 to August 1978. Since the rate of sedimentation at Fishtrap Lake continues to be excessive, the Huntington District will continue monitoring sediment inflow into the lake.
- 4. Dewey Lake, Johns Creek, Kentucky: The report on the 1978 sedimentation survey was submitted to and approved by the Ohio River Division in 1979. The 1978 resurvey of 18 sediment ranges indicated an annual sedimentation rate of 0.82 acre-foot per square mile of contributing drainage area for the 2.71-year period from November 1975 to July 1978. Since the indicated rate of sedimentation for the period between the 1975 and the 1978 resurveys is greater than for the previous periods investigated, monitoring of sediment inflow into Dewey Lake is recommended to continue.
- 5. Sutton Lake, Elk River, West Virginia: A sedimentation reconnaissance survey of Sutton Lake was completed in 1979. A report on this reconnaissance investigation was submitted to and approved by Ohio River Division in 1979.

- 6. Paint Creek Lake, Paint Creek, Ohio: A resurvey of 12 sediment ranges at Paint Creek Lake was completed in 1979 and a report on the results of this latest resurvey is scheduled to be completed by the Huntington District in 1981.
- 7. Piedmont Lake, Stillwater Creek, Ohio: A resurvey of nine sediment ranges at Piedmont Lake was completed in 1979. The report on the results of this latest resurvey is scheduled to be completed by the Huntington District in 1981.
- 8. The J. Percy Priest Reservior Resurvey Report was completed and approved in 1979.

Initial Range Surveys and Range Layouts.

- 1. One Category "C" sediment range below Piedmont Dam was established and a profile along the range obtained in 1979.
- 2. Dillon Lake, Licking River, Ohio: Three Category "C" sediment ranges below Dillon Dam were established and profiles along the ranges obtained in 1979.
- 3. Layout and initial survey of sedimentation ranges at Taylorsville Lake are underway.
- 4. The initial survey of Laurel River Reservoir and the report "Design Memorandum No. 9, Reservoir Sedimentation Ranges, Laurel River Reservoir, Supplement" was completed and approved by Division in 1979.
- 5. Tennessee-Tombigbee Waterway, Bay Springs. Establishment of base sedimentation ranges and control surveys is presently underway. Submission of the Sediment Design Memorandum "Canal and Reservoir Sediment Range Survey N-16" is scheduled for October 1980.

Sediment Load Measurements.

- 1. A full-section sediment station is being operated on the Ohic River by U.S.G.S. at Louisville. They are gaging suspended sediment. Some bottom flow samples will be taken. Mr. Russell Flint, the program manager, has measured an unexpected large volume of sand-size (0.062 mm+) particles in the suspended samples.
 - 2. Big South Fork Recreation Area.
- (a) Construction has been completed of water quality and sediment monitoring stations at Big South Fork near Stearns and Clear Fork near Robbins. Monitoring at these stations is to begin soon.
- (b) An additional water quality and sediment monitoring station is planned for Big South Fork at Leatherwood Ford. The gage house is to be incorporated in the bridge abutment of the new Leatherwood Ford Bridge.

- 3. Fishtrap Lake, Levisa Fork, Kentucky and Dewey Lake, Johns Creek, Kentucky: Suspended sediment data were collected by the U.S. Geological Survey in cooperation with the Huntington District at Levisa Fork at Big Rock, Virginia and Johns Creek at Meta, Kentucky, gaging stations. The Huntington District collected suspended sediment data on four tributary streams in the Fishtrap Lake drainage basin, and on three tributary streams in the Dewey Lake drainage basin during 1979.
- 4. R. D. Bailey Lake, Guyandot River, West Virginia: The sediment monitoring program, being conducted in cooperation with the U.S. Geological Survey at R. D. Bailey Lake, was modified in 1979. Sediment data were collected by the Huntington District at the Clear Fork and Indian Creek monitoring stations during 1979. The U.S. Geological Survey collected sediment data at the Guyandot River near Baileysville, West Virginia, monitoring station through 30 September 1979. After that date, the Huntington District operated the Baileysville monitoring station.
- 5. The Huntington District discontinued participation with the U.S. Geological Survey in the collection of suspended sediment data at the Tug Fork at Glenhayes, West Virginia, and the Levisa Fork at Paintsville, Kentucky, gaging stations at the close of calendar year 1978. Data collected at these two stations are being used in the development of a mathematical model of the lower reach of the Big Sandy River by the Waterways Experiment Station at Vicksburg, Mississippi. The Big Sandy River discharges into the Ohio River between Huntington, West Virginia and Ashland, Kentucky, and into the pool created by the Greenup Dam. The objective of the study is to identify measures to maintain sediment movement through the lower reach of the Big Sandy River to the Ohio River. Dredging to maintain a navigation channel in this area would thus be reduced.

Additional Division Activities

Special Programs.

1. Construction of a high level intake at Sutton Dam began in October 1979 and is scheduled for completion in May 1980. Its purpose is the improvement of environmental attributes of the Elk River downstream of Sutton Dam. With the high level intake, it is anticipated that a slight increase in sediment deposition in the lake will be experienced.

2. Tennessee-Tombigbee Waterway:

(a) In order to control the sediment and turbidity of flows flowing South from the Divide Cut work area, a 300-acre impoundment was created behind a 10-foot high dam constructed in the future pool of Bay Springs Lake. The removal efficiency of the reservoir has been measured as high as 98 percent for sediment and 82 percent for turbidity. In the Bay Springs Lock and Dam construction area, contractors have been fairly successful in meeting turbidity specifications. Turbidity measurements

downstream of the site are taken at the new water quality monitoring station on Mackeys Creek and compared to inflow turbidities to insure no increase due to construction activities.

- (b) Section 4 and 2A (Big 4). Diversion ditches for flows flowing north out of the contract area are under construction. The ditches will be diverting the flows into the old test pit which will be used as a settling basin. Potential sediment runoff from disposal areas into the waterway work area is being controlled by diking systems.
- (c) Northern End. A silt curtain that was planned for installation in the Yellow Creek embayment was eliminated. Plans are now being prepared for the removal of sediment in the Yellow Creek embayment. Turbidity measurements are being taken at the water quality monitoring station on Yellow Creek.

3. Local Protection Projects:

- (a) Middlesboro, Kentucky. Bennets Fork Diversion Canal. The remedial work of removing sediment in the channel between Station 0+95 and Station 73+50 has been completed.
- (b) Lake City, Tennessee. Coal Creek Channel Improvement. The amount of deposition from the April 1977 Flood was determined for Federal Emergency Management Agency.
- 4. Construction of the Littcarr Sediment Dam is nearly complete with four sampling stations to be operational in the spring of 1980.

OHIO REGION

GEOLOGICAL SURVEY

Monongahela Subregion

- 1. Suspended-sediment data are being collected about monthly at Shavers Fork at Bemis, W. Va., Stalnaker Run near Bowden, W. Va., Taylor Run near Alpena, W. Va., and at Shavers Fork near Elkins, W. Va., in cooperation with the West Virginia Department of Highways.
- 2. Suspended-sediment data are being collected on a daily basis at Taylor Run at Bowden, W. Va., at Shavers Fork above Bowden, W. Va. and at Shavers Fork below Bowden, W. Va., as part of the Shavers Fork Basin Cooperative Program with the West Virginia Department of Highways.
- 3. Suspended-sediment data are being collected on a near monthly and storm event basis at Becky Creek at Hwy. 56, Branch near Huttonsville, W. Va., Leading Creek at Hwy. 3 Branch near Kerens, W. Va.; Sand Run near Buckhannon, W. Va.; Three Fork Creek at Hwy. 33 Branch near Gladesville, W. Va.; West Fork River at Hwy. 19 Branch at Roanoke, W. Va.; Little Paw Creek at Hwy. 25 Branch at Hoodsville, W. Va.; Shavers Fork at Hwy. 250 Branch at Cheat Bridge, W. Va.; Big Sandy Creek at Hwy. 14 Branch at Clifton Mills, W. Va. as part of the USGS's Coal Hydrology Monitoring project.
- 4. Suspended-sediment data are being collected on a monthly basis at Youghiogheny River at Friendsville, Md., and Casselman River at Grantsville, Md., as part of hydrologic assessment of the Eastern Coal Province.

Upper Ohio Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Ohio River at Benwood, near Wheeling, W. Va., and at Little Kanawha River at Palestine, W. Va., as a part of the National Stream Quality Accounting Network (NASQAN).
- 2. Suspended-sediment data are being collected on a monthly basis at Kings Creek near Weirton, W. Va., (discontinued January 1979), at Little Grave Creek near Moundsville, W. Va., at Par Run near mouth near Moundsville, W. Va., and at Middle Grave Creek near Moundsville, W. Va., in cooperation with the U.S. Soil Conservation Services.
- 3. Suspended-sediment data are being collected on a near monthly and storm event basis at Little Grave Creek at Hwy. 10 Branch at Glendale Hts., W. Va.
- 4. Suspended-sediment data are being collected on a daily basis and with automated samplers at Little Kanawha River near Wildcat, W. Va., as part of the USGS's Coal Hydrology Monitoring project.
- 5. Suspended-sediment data are being collected on a near monthly and storm-event basis at Coxcamp Fork at Hwy. 47 Branch at Coxs Mills, W. Va.; Henry Fork at Hwy. 25 Branch at Linden, W. Va.; Bonds Creek at Hwy. 1 Branch at Highland, W. Va., as part of the USGS's Coal Hydrology Monitoring project.

- 6. Suspended-sediment data are being collected on a daily basis at Hocking River below Athens, Ohio, in cooperation with the Ohio Department of National of Natural Resources.
- 7. Suspended-sediment data are being collected on a daily basis at Consol Run near Bloomingdale, Ohio, in cooperation with the U.S. Environmental Protection Agency (EPA).

Muskingum Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Muskingum River at McConnelsville, Ohio, in cooperation with the Ohio Department of National Resources.
- 2. Suspended-sediment data are being collected on a daily basis at Sard Fork near Wakatomika, Ohio, in cooperation with the U.S. EPA.
- 3. Suspended-sediment data are being collected on a near-monthly and stormevent basis at Clear Fork tributary near Hanover, Ohio, and at Opossum Run tributary near Wakatomika, Ohio, in cooperation with the U.S. EPA.

Kanawha Subregion

- 1. Suspended-sediment data are being collected on a near monthly basis at Kanawha River at Winfield, W. Va. as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a daily basis at Little Coal River at Danville, W. Va., Little Coal River at Julian, W. Va., Fig Coal River near Alum Creek, W. Va., Coal River at Alum Creek, W. Va., Coal River at Tornado, W. Va., Rock Creek at Danville, W. Va., and Rock Creek at Rock Creek, W. Va., in cooperation with the West Virginia Department of Highways.
- 3. Suspended-sediment data are being collected on a near monthly basis at Howard Creek at Caldwell, W. Va., (discontinued January 1979), in cooperation with the U.S. Soil Conservation Service.
- 4. Suspended-sediment data were collected about monthly at Cranbery Creek at Beckley, W. Va., Little Whitestick Creek at Beckley, W. Va., Soak Creek at Sophia, W. Va., Crab Orchard Creek at Crab Orchard, W. Va. (discontinued September 30, 1979), Beaver Creek at Beaver, W. Va., (discontinued September 30, 1979), and at Piney Creek at Raleigh, W. Va. (discontinued September 30, 1979), in cooperation with the U.S. Soil Conservation Service.
- 5. Suspended-sediment data are being collected on a near monthly and storm-event basis at Laurel Creek at Wallis Branch near Sandstone, W. Va.; Gauley River at Hwy. 46 Branch at Williams River, W. Va.; Campbells Creek at Hwy. 73 Branch downstream from Coal Fork, W. Va.; Leatherwood Creek at Hwy. 26/4 Branch at Bergoo, W. Va.; Laurel Creek at Hwy. 9 Branch at Erbacon, W. Va.; Grassy Creek at Hwy. 20 Branch at Diana, W. Va.; Little Birch River at Hwy.

- 40/15 Branch near Little Birch, W. Va.; Eighteen Mile Creek at Hwy. 6 Branch at White Star School, W. Va.; Clear Fork at Hwy. 1/21 Branch at Leevale, W. Va., as part of the USGS's Coal Hydrology Monitoring project.
- 6. Suspended-sediment data are being collected on a daily basis and with automatic samplers at Buffalo Creek at Barracksville, W. Va.; Piney Creek at Raleigh, W. Va.; and Cranberry River near Richwood, W. Va., as part of the USGS's Coal Hydrology Monitoring project.

Scioto Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Scioto River at Higby, Ohio, in cooperation with the Ohio Department of National Resources.
- 2. Suspended-sediment data are being collected on a daily and storm-event basis at the following locations in cooperation with the Ohio Department of Transportation:

Olentangy River near Worthington, Ohio
315 Expressway and Rt. 161 Drainage at Worthington, Ohio
Rush Run at Worthington, Ohio
Linworth Road Creek at Columbus, Ohio
Bethel Road Creek at Columbus, Ohio
Unnamed Tributary to Olentangy River at 315 Expressway
at Columbus, Ohio
Olentangy River at Henderson Road at Columbus, Ohio

Big Sandy-Guyandotte Subregion

- 1. As part of the Coal Monitoring program in southwestern Virginia, suspended-sediment samples were collected at six stations on about a 6-week basis, suspended-sediment and coal-separation samples were collected three times at about 25 synoptic sites, bottom-material samples for coal-separation analysis were collected at 20 sites and bottom-material samples for trace-metals analysis were collected at 19 sites in the Big Sandy River basin.
- 2. Suspended-sediment data are being collected on a daily basis at Levisa. Fork at Big Rock, Va., as part of the Coal Hydrology program.
- 3. Suspended-sediment data are being collected, on a near monthly basis at Guyandotte River at Branchland, W. Va., as a part of NASQAN.
- 4. Suspended-sediment data are being collected on a daily basis at Guyandotte River near Baileysville, W. Va., (discontinued September 30, 1979), as part of the Cooperative Reservoir Study with the U.S. Corps of Engineers.
- 5. Suspended-sediment data are being collected on a daily basis at Marsh Fork at Maben, W. Va., Still Run at Itman, W. Va., Allen Creek at Allen Junction, W. Va., and at Bearhole Fork at Pineville, W. Va., as part of a study on the effects of mining on the hydrologic environment of Southern West Virginia, in cooperation with the West Virginia Geological and Economic Survey.

- 6. Suspended-sediment data are being collected on about monthly and storm event basis at Milan Fork at McGraws, W. Va. (changed to daily basis January 1979), as part of a study of the effects of mining on the hydrologic environment of Southern West Virginia, in cooperation with the West Virginia Geological and Economic Survey.
- 7. Suspended-sediment data are being collected on a daily basis at Elkhorn Creek at Maitland, W. Va., Tug Fork at Welch, W. Va., Pigeon Creek at LeNore, W. Va., and at Dry Creek at Avondale, W. Va., as part of the Tug River Basin project in cooperation with the West Virginia Geological and Economic Survey and the West Virginia Department of Natural Resources.
- 8. Suspended-sediment data are being collected on a daily basis at Tug Fork near Glenhayes, W. Va., in cooperation with the West Virginia Geological and Economic Survey as part of the Tug River Basin project.
- 9. Suspended-sediment data are being collected on a near monthly and storm-event basis at Pennacle Creek at Hwy. 16 Branch near Pineville, W. Va.; Buffalo Creek at Hwy. 16/5 Branch at Kistler, W. Va.; Middle Fork at Hwy. 3 Branch at Hamlin, W. Va.; Elkhorn Creek at Hwy. 52/20 Branch at Elkhorn, W. Va.; Panther Creek near Panther, W. Va.; Pigeon Creek near LeNore, W. Va., as part of the USGS's Coal Hydrology Monitoring project.
- 10. Suspended-sediment data are being collected on a monthly basis at Big Sandy River at Louisa, Ky., as a part of NASQAN, and as part of the Coal Hydrology program.
- 11. Suspended-sediment data are being collected on a daily basis at Johns Creek near Meta, Ky., to monitor sediment discharge into Dewey Lake. The work is being done in cooperation with the U.S. Corps of Engineers, Huntington District, and as part of the Coal Hydrology program.
- 12. Suspended-sediment data are being collected on a quarterly basis at Grape-vine Creek near Phyllis, Ky., and at Dicks Fork at Phyllis, Ky., as a part of the Coal Hydrology project.
- 13. Suspended-sesdiment data are being collected on a weekly and storm-event basis at Russell Fork at Elkhorn City, Ky., Levisa Fork at Pikeville, Ky., and Johns Creek near Van Lear, Ky., as part of the Coal Hydrology program.
- 14. Suspended-sediment data are being collected on a quarterly basis at 41 other locations as part of the Coal Hydrology program.

Great Miami Subregion

- 1. Suspended-sediment data are being collected on an intermittant basis at White-water River near Hagerstown, Ind., and on a flood-event basis at East Fork Whitewater River at Abington, Ind. This work was done in cooperation with the State of Indiana.
- 2. Suspended-sediment data are being collected on an intermittent basis at Whitewater River at Brookville, Ind., as a part of NASQAN.

Middle Ohio Subregion

- 1. Suspended-sediment data are being collected at Ohio River at Greenup Dam, Ky., as part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at Upper Twin Creek at McGaw, Ohio, and at South Hogan Creek near Dillsboro, Ind., as a part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected at Little Miami River at Milford, Ohio, in cooperation with the Ohio Department of Natural Resources.
- 4. Suspended-sediment data are being collected daily at Big Four Hollow Creek near Lake Hope, Ohio, and at the following stations in the Raccoon River basin on a storm-event basis in cooperation with the Ohio Department of Natural Resources:

Sandy Run above Big Four Hollow Creek, near Lake Hope, Ohio Big Four Hollow Creek below East Fork, near Lake Hope, Ohio Hull Hollow Creek near Lake Hope, Ohio Sandy Run below Hull Hollow Creek, near Lake Hope, Ohio

- 5. Suspended-sediment data are being collected on a monthly basis at Ohio River at Greenup Dam, Ky., and Ohio River at Markland Dam, Ky., as a part of NASQAN.
- 6. Suspended-sediment data are being collected on a weekly and storm-event basis at Tygarts Creek near Greenup, Ky., and Little Sandy River at Grayson, Ky., as part of the Federally funded Coal Hydrology network.
- 7. Suspended-sediment data are being collected on a quarterly basis at 10 locations in Kentucky, as part of the Federally funded Coal Hydrology network.

Kentucky-Licking Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Licking River at Butler, Ky., and at Kentucky River at Lock 2 at Lockport, Ky., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a five week frequency at the following stations to define sediment yields by physiographic province in Kentucky.

North Fork Triplett Creek near Morehead, Ky. North Fork Licking River near Lewisburg, Ky. Troublesome Creek at Noble, Ky. Goose Creek at Manchester, Ky. Red River near Hazel Green, Ky. Elkhorn Creek near Frankfort, Ky.

This work is done in cooperation with the Kentucky Geological Survey. The Goose Creek and Red River stations are also part of the Coal Hydrology program.

- 3. Suspended-sediment data are being collected on a daily basis at Middle Fork Kentucky River near Hyden, Ky., in cooperation with the U.S. Corps of Engineers, Louisville District, and as part of the Coal Hydrology program.
- 4. Suspended-sediment data are being collected on a weekly and storm-event basis at:

North Fork Kentucky River at Hazard, Ky. North Fork Kentucky River at Jackson, Ky. Middle Fork Kentucky River at Tallega, Ky. South Fork Kentucky River at Booneville, Ky.

5. Suspended-sediment data are being collected on a quarterly basis at 54 locations in Kentucky as part of the Coal Hydrology program.

Green Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Graen River near Beech Grove, Ky., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a daily basis at Green River at Munfordville, Ky., as a part of the Federal Sediment Index Network.
- 3. Suspended-sediment data are being collected on a 5-week frequency at the following stations in cooperation with the Kentucky Geological Survey.

Russell Creek near Columbia, Ky.
Nolin River near White Mills, Ky.
South Fork Panther Creek near Whitesville, Ky.
Bacon Creek near Priceville, Ky. (started Oct. 1, 1978)

4. Suspended-sediment data are being collected on a weekly and storm-event basis as part of the Federally funded Coal Hydrology network at:

Rough River at Dundee, Ky.
Pond River near Apex, Ky.
Pond River near Vandetta, Ky.
Green River at Rockport, Ky.
Cypress Creek near Calhoun, Ky.
Panther Creek near Owensboro, Ky.
Green River at Lock 2 at Calhoun, Ky.

5. Suspended-sediment data are being collected on a quarterly basis at 47 locations in Kentucky as part of the Federally funded Coal Hydrology network.

Wabash Subregion

1. Suspended-sediment data are being collected on a daily basis at Buck Creek near Muncie, Ind., and at East Fork White River at Seymour, Ind., in cooperation with the State of Indiana, and at Big Blue River at Carthage, Ind., for

- the U.S. Corps of Engineers. Additional sampling in cooperation with the State of Indiana consists of six weekly stations, five intermittent stations, and four high-flow only stations.
- 2. Suspended-sediment data were collected once at 40 sites and bed-material samples once at seven sites in Indiana as part of the Federal Energy program.
- 3. Suspended-sediment data were collected monthly at White River at Hazelton, Ind., as part of NASQAN.
- 4. Suspended-sediment data are being collected on a daily basis at Eel River near Logansport, Ind., and at Wabash River at Lafayette, Ind., in cooperation with the State of Indiana.
- 5. Suspended-sediment data are being collected on an weekly basis at three sites, on an intermittent basis at six sites, and on a storm-event basis at five sites in cooperation with the State of Indiana.
- 6. Suspended-sediment data were collected once at 33 sites and bed-material samples once at seven sites in Indiana as part of the Federal Energy program.
- 7. Suspended-sediment data were collected four times at four sites as part of the Federal Energy program and in cooperation with the U.S. Environmental Protection Agency.
- 8. Suspended-sediment data are being collected on a intermittent basis at Wabash River at New Harmony, Ind., and on a monthly basis at Little Wabash River at Carmi, Ill., as a part of NASQAN.
- 9. Suspended-sediment data are being collected on a daily basis at Little Wabash River at Louisville, Ill., and at Embarras River near Oakland, Ill., in cooperation with the U.S. Corps of Engineers, Louisville District.

Cumberland Subregion

- 1. As part of the Coal Hydrology program, a suspended-sediment discharge station is being operated at Smoky Creek near Hembree, Tenn., in the New River basins. This station monitors daily and storm loads. Also in conjunction with this same program, miscellaneous suspended-sediment discharge measurements are being made at 51 other sites in this Subregion within the State of Tennessee.
- 2. In cooperation with the Tennessee Department of Public Health, Division of Water Quality Control, suspended-sediment discharge measurements are being made on a six-week frequency at 11 sites in this Subregion within the State of Tennessee.
- 3. Suspended-sediment data are being collected on a monthly basis at Cumberland River at Carthage, Tenn., and at Cumberland River near Grand Rivers, Ky., as a part of NASQAN.

4. Suspended-sediment data are being collected on a 5-week frequency at the following stations in cooperation with the Kentucky Geological Survey:

Buck Creek near Shopville, Ky. Little River near Cadiz, Ky.

5. Suspended-sediment data are being collected on a daily and storm-event basis in cooperation with the U.S. Army Corps of Engineers, Nashville District, and as part of the Coal Hydrology program at the following stations:

Clover Fork near Harlan, Ky. Yellow Creek near Middlesboro, Ky. Cumberland River at Barboursville, Ky. Cumberland River near Pineville, Ky.

6. Suspended-sediment data are being collected on a weekly and storm-event basis as part of the Coal Hydrology program at:

South Fork Cumberland River near Sterns, Ky. Clear Fork near Saxton, Ky. Rockcastle River near Billows, Ky. Cumberland River at Williamsburg, Ky.

7. Suspended-sediment data are being collected on a quarterly basis at 29 miscellaneous stations of the Coal Hydrology program.

Lower Ohio Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Rolling Fork near Lebanon Junction, Ky., Salt River at Shepherdsville, Ky., Ohio River at Cannelton Dam, Ky., and at Ohio River at Lock and Dam 53 near Grand Chain, Ill., as part of NASQAN.
- 2. Suspended-sediment data are being collected on an intermittent basis at Indian-Kentuck Creek near Canaan, Ind., on a highflow only basis at Middle Fork Anderson River at Bristow, Ind., and on a daily basis at West Fork Blue River at Salem, Ind., in cooperation with the State of Indiana.
- 3. Suspended-sediment data were collected once at nine sites in Indiana as part of the Federal Energy program.
- 4. Suspended-sediment data are being collected on a 3-times weekly and stormevent basis at Ohio River at Louisville, Ky., in cooperation with the U.S. Corps of Engineers, Louisville District.
- 5. Suspended-sediment data were collected 3-times at four sites and once at four other sites in Indiana in cooperation with the U.S. Soil Conservation Service.
- 6. Suspended-sediment data are being collected on a daily and storm-event basis at Floyds Fork near Crestwood, Ky., in cooperation with the Kentucky Department of Natural Resources.

- 7. Suspended-sediment data on a weekly and storm-event basis at Tradewater River at Olney, Ky., as part of the Coal Hydrology program.
- 8. Suspended-sediment data are collected on a quarterly basis at 13 locations in Kentucky as part of the Coal Hydrology program.
- 9. Suspended-sediment data are collected on a 5-week and storm-event basis at Massac Creek near Paducah, Ky. in cooperation with the Kentucky Geological Survey.

Special Studies

Suspended-sediment data were collected with automatic samplers at three sites in Greene County, Penn., during 1979,--Castile Run at Clarksville, Penn., Whitely Creek near Kirby, Penn., and Enlow Fork of Wheeling Creek, near West Finley, Penn. These data were collected as part of a study to evaluate the effects of mining on streams in Greene County.

A four-year study began in 1978 to evaluate surface mining influences on sedimentation characteristics of basins in the Allegheny and Monogahela geologic series in Ohio.

A four-year study began in 1978 to evaluate and quantify any impact that highway construction has on sediment loads to neighboring streams at the construction site of Ohio State Route 315 in Columbus, Ohio.

The project report is in review stage on the Federally-funded project, "Down-stream effects of coal mining on Levisa Fork of the Big Sandy River, Kentucky-Virginia.

Suspended-sediment data were collected with automatic samplers at two sites in the Big Sandy Creek basin during 1979. The sites are a tributary to Stoney Fork near Gibson Glade and Stoney Fork near Elliotsville. The data were collected as part of a study to evaluate the effects of surface mining on the Big Sandy Creek basin of Southwestern Pennsylvania.

In cooperation with the Tennessee Department of Transportation, the problem of scour at highway bridges is being investigated at known and potential problem sites across Tennessee. Reports documenting data and research findings are planned.

In cooperation with several State and Federal agencies, suspended-and bed-sediment yields were measured at several locations in the heavily mined New River basin, Tenn. Suspended-sediment discharge was measured at two storm-event and three daily-plus-storm-event sites. Bedload measurements were also made at two other sites. Periodic bed and suspended-sediment particle-size determinations were made. Data collection in conjunction with this effort ceased on September 30, 1979. A final project report is in preparation.

A paper, "Sediment Characteristics of the New River, Tennessee," by William P. Carey was published in December 1979, in the Proceedings Symposium on Surface Mining, Hydrology, Sedimentology and Reclamation, University of Kentucky BUll9, p. 197-202.

In cooperation with the U.S. Army Corps of Engineers, two suspended-sediment discharge stations were established; one at the mouth of the Clear Fork basin and one on the Big South Fork Cumberland River, Tenn. A third suspended-sediment discharge station on New River at New River, Tenn., is currently in operation. These stations monitor daily and storm-event loads. These data will be used to define current water quality conditions within the Big South National River and Recreation Area, Tennessee.

Professional paper 427D by John A. McCabe, a report on the 1974 phase of sediment studies at Cane Branch near Parkers Lake, Ky., is in review stage. This work was done in cooperation with a number of Federal and state agencies.

For additional information about Gelogical Survey activities within this region, contact the following offices:

JDistrict Chief, WRD U.S. Geological Survey P.O. Box 1026 605 North Neil Street Champaign, IL 61820

District Chief, WRD U.S. Geological Survey 975 West Third Avenue Columbus, OH 43212

District Chief, WRD
U.S. Geological Survey
Federal Building and
U.S. Courthouse, Room A-413
Nashville, TN 37203

District Chief, WRD
U.S. Geological Survey
Federal Building and U.S. Courthouse
Room 3017
500 Quarrier Street
East Charleston, WV 25301

District Chief, WRD U.S. Geological Survey 1819 North Meridian Street Indianapolis, IN 46202

District Chief, WRD U.S. Geological Survey P.O. Box 1107 Federal Building, Fourth Floor 228 Walnut Street Harrisburg, PA 17108

District Chief, WRD U.S. Geological Survey 200 West Grace Street Room 304 Richmond, VA 23220

District Chief, WRD U.S. Geological Survey Rm. 572, Federal Building 600 Federal Place Lawrence, KY 40202

OHIO REGION

SOIL CONSERVATION SERVICE

1. Studies of sediment damages and determinations of sediment yields were made in the following watersheds:

a. Public Law 566

Major Drainage	Watershed	Stream	County(s)	<u>State</u>
Scioto River	Rattlesnake Crk	Rattlesnake Crk	Clinton	ОН
			Fayette	
			Greene	
			Highland	
			Madison	

b. Public Law 9587

Loch Mary was constructed in 1892, and is presently the water supply reservoir for Earlington, Kentucky. Much of the drainage area to the lake has been strip mined in the past. As a consequence of the mining activity, large quantities of sediment have accumulated in the lake, necessitating cleanout several times to renovate storage capacity.

A reservoir survey was conducted to determine the present water capacity of the lake and to provide a datum for measuring the effectiveness of furture changes in land use and treatment of the drainage area.

Major Drainage	Watershed	Stream	County	State
Ohio River	Tradewater	Clear Crk	Hopkins	KY

2. Reservoir Sedimentation Surveys

- a. A reservoir sedimentation survey was made on structure No. 12, Little Cache Creek watershed, Johnson County, Illinois.
- A reservoir sedimentation survey was made on structure No.
 9, Elk Creek watershed, Washington County, Indiana. Computations are incomplete.

TENNESSEE REGION

GEOLOGICAL SURVEY

Upper Tennessee Subregion

- 1. As part of the Coal Hydrology program in southwestern Virginia, suspended-sediment samples were collected at nine stations on about a 6-week basis, suspended-sediment and coal-separation samples were collected three times at about 20 synoptic-survey sites, bottom-material samples for coal-separation analysis were collected at 14 sites, and bottom-material samples for trace-metals analysis were collected at 15 sites, in the Clinch-Powell River basins.
- 2. Suspended-sediment data are being collected on a monthly basis at French Broad River at Marshall, N.C., French Broad River near Knoxville, Tenn., and at Clinch River at Melton Hill Dam, Tenn., and at Holston River near Knoxville, Tenn., as part of NASQAN.
- 3. In conjunction with the Coal Hydrology program, miscellaneous susperdedsediment discharge measurements are being made at 21 sites within the State of Tennessee.
- 4. In cooperation with the Tennessee Department of Public Health, Division of Water Quality Control, suspended-sediment discharge measurements are being made on a 6-week frequency at eight sites within the State of Tennessee.

Middle Tennessee-Hiwassee Subregion

- 1. In conjunction with the Coal Hydrology program, miscellaneous susperdedsediment discharge measurements are being made at 13 sites within the State of Tennessee.
- 2. In cooperation with the Tennessee Department of Public Health, Division of Water Quality Control, suspended-sediment discharge measurements are being made on a 6-week frequency at Oostanaula Creek near Sanford, Tennessee.
- 3. Suspended-sediment data are being collected on a monthly basis at Tennessee River at Watts Bar Dam, Tenn., as part of NASQAN.
- 4. Suspended-sediment data are being collected in the Tennessee River hasin in Georgia at three sites on a monthly basis and at 13 sites on a quarterly basis as part of the OSM Coal Hydrology program.

Tennessee-Elk Subregion

1. In conjunction with the Coal Hydrology program, miscellaneous suspendedsediment discharge measurements are being made at 12 sites within the State of Tennessee.

- 2. In cooperation with the Tennessee Department of Public Health, Division of Water Quality Control, suspended-sediment discharge measurements are being made on a 6-week frequency at Shoal Creek near Iron City, Tenn.
- 3. Suspended-sediment data are being collected on a monthly basis at Tennessee River at South Pittsburg, Tenn., as a part of NASQAN. This site is also in a national pesticide monitoring network which requires periodic streambed sediment sampling.
- 4. Suspended-sediment data are being collected by an automatic sampler at Yellow Creek at Cross Roads, Miss., in cooperation with the U.S. Corps of Engineers.

Lower Tennessee Subregion

- 1. In cooperation with the Tennessee Department of Public Health, Division of Water Quality Control, suspended-sediment discharge measurements are being made on a 6-week frequency at three sites within the State of Tennessee.
- 2. Suspended-sediment data are being collected on a monthly basis at Tennessee River at Pickwick Landing Dam, Tenn., and at Tennessee River at Highway 60 near Paducah, Ky., as a part of NASQAN.
- 3. Suspended-sediment data are being collected on a periodic basis at Buffalo River near Flat Woods, Tenn., as part of the National Hydrologic Benchmark Network.
- 4. Suspended-sediment data are being collected on a 5 week-frequency at West Fork Clarks River near Brewers Creek, Ky., in cooperation with the Kentucky Geological Survey.
- 5. Suspended-sediment data are being collected on a periodic basis at Toccoa River near Dial, Ga., in cooperation with the Georgia Geologic Survey.

Special Studies

In cooperation with the Tennessee Department of Transportation, the problem of scour at highway bridges is being investigated at known and potential problem sites across Tennessee. Reports documenting data and research findings are planned.

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD
U.S. Geological Survey
6481 Peachtree Industrial
Boulevard, Suite B
Doraville, GA 30360

District Chief, WRD U.S. Geological Survey 100 W. Capitol St., Suite 710 Jackson, MS 39201 District Chief, WRD U.S. Geological Survey P.O. Box 2857, Century Station Post Office Building, Room 436 Raleigh, NC 27602

District Chief, WRD U.S. Geological Survey Room 572, Federal Building 600 Federal Place Louisville, KY 40202 District Chief, WRD U.S. Geological Survey Federal Building and U.S. Courthouse Room A-413 Nashville, TN 37203

District Chief, WRD U.S. Geological Survey 200 West Grace St., Rm. 304 Richmond, VA 23220

TENNESSEE REGION

Tennessee Valley Authority

During 1979 established sediment ranges were sounded on the La Follette, Tennessee, water supply reservoir, Ocoee No. 1, Ocoee No. 3, and Cherokee Reservoirs. Sediment ranges were established and initial surveys made on Cedar Creek Reservoir, part of the Bear Creek Project in north Alabama. Suspended sediment sampling began at four locations as part of the St. Charles, Virginia, Watershed Reclamation Project, a cooperative study with the Office of Surface Mining and the Virginia Division of Mined Land Reclamation. Suspended sediment sampling, deposited sediment surveys, and core sampling were conducted as part of a comprehensive engineering and environmental investigation of DDT contamination of Huntsville Spring Branch, Indian Creek and adjacent land and waters, Wheeler Reservoir in northern Alabama.

La Follette Water Supply Reservoir (Upper Ollis Creek Reservoir)

This reservoir, filled in 1964, was surveyed for the ninth consecutive year since the 46 sediment ranges were established, sounded, and probed in 1970. Deposited sediment accumulations are being monitored to ascertain the effects of strip mining and subsequent reclamation work in the watershed. The 1979 survey showed a total of 60 acre-feet of sediment, an average increase of 3.6 acre-feet since 1974, but about one-third the rates experienced in 1972 and 1973.

Ocoee No. 1 Reservoir

Thirty-seven sediment ranges of the 38 ranges established in 1949 were sounded. The reservoir was filled in 1911 and TVA made a survey in 1940, but ranges were not established during this investigation. Five sediment surveys were made from 1954 to 1976. The 1979 survey indicated a total deposit of 24,800 acre-feet of sediment and a storage loss of 22.7 percent since dam closure in 1911.

Ocoee No. 3 Reservoir

Thirty of the 31 established sediment ranges were sounded. This reservoir was filled and ranges established in 1942. Thirteen sediment surveys were made from 1945 to 1976. The 1979 survey indicated a total deposit of 11,000 acre-feet of sediment and a storage loss of 77 percent, a net reduction of 400 acre-feet of deposits since the previous survey in 1976. The reservoir was drawn to minimum levels in December 1976, and in March and October 1978 to flush sediment from the reservoir.

Cherokee Reservoir

Twenty-nine ranges were established prior to filling the reservoir in 1941. Prior to the 1979 survey, surveys were made at 5-year intervals between 1949 and 1964.

UPPER MISSISSIPPI REGION

CORPS OF ENGINEERS

North Central Division

Chicago District

Two sediment-related studies conducted for the Chicago District were completed in 1979. Both studies are related to the "Study and Demonstration Program for an Increase in Lake Michigan Diversion at Chicago" as authorized by Section 166 of the Water Resources Development Act of 1976.

The first study, entitled "Bank Erosion of the Illinois River" involved a bank erosion survey of the Illinois River between Joliet (River mile 285.0) and Grafton, Illinois (River mile 0.0). A total of 20 eroded river reaches within the Study area were selected for detailed analysis. Plan views and bank slopes were surveyed and a permanent concrete monument was installed at each selected reach to allow for the possibility of future monitoring. A total of 67 bank material samples and 54 bed material samples were classified and analyzed with respect to particle size distribution to determine the nature and extent of shoreline erosion. Stability analyses indicated that bank erosion along the Illinois River would not be affected by the proposed Increased Diversion Program.

The second study, entitled "Sediment Transport in the Illinois River", provided relationships between sediment loading and water discharge at select locations based on historic data collected by the United States Geological Survey (USGS), the Northeastern Illinois Planning Commission (NIPC), and the Metropolitan Sanitary District of Greater Chicago (MSDGC). On the basis of these data, computations were made to estimate the probable sedimentation effects of increased Lake Michigan diversion from 3200 cfs (current) to 6600 cfs and 10,000 cfs (proposed). The following conclusions were made:

- 1. The most severe sediment-related effects of increased diversion will be in the Chicago Sanitary and Ship Canal, which is located between and hydraulically connected to Lake Michigan and the Illinois River. The sewage sludge deposited on the bed and banks of the Canal (from wastewater treatment plant effluents and combined sewer overflows) will probably be washed away, at least partially, during the initial period of diversion. A gradual decrease in the scour will take place possibly within a few days of the start of diversion, depending upon the rate of increase of the diverted flow.
- 2. The eroded sludge will deposit in the pools downstream of the Canal.

3. An increase in sediment load will take place with an increase in discharge in the middle and lower reaches of the Illinois River.

The above conclusions were based on an extremely limited amount of data. Statistically, the reliability of the sediment rating curves developed for this study is not very high. Additional data may or may not substantiate these conclusions.

References:

- 1. Bhowmik, N. G., and R. J. Schicht, "Bank Erosion of the Illinois River," Illinois State Water Survey Contract Report, January 1979.
- 2. Lee, M. T., and N. G. Bhowmik, "Sediment Transport in the Illinois River," Illinois State Water Survey Contract Report, April 1979.

Rock Island District

<u>Sedimentation Surveys</u>. The establishment and survey of reservoir sedimentation ranges in Lake Red Rock and about 100 percent completed. A resurvey report is scheduled to be prepared this calendar year.

The establishment and survey of reservoir sedimentation ranges in Saylorville Lake are approximately 60 percent completed.

Suspended Sediment Sampling. Suspended load sampling is being conducted at 35 stations, four located on the Mississippi River and 31 on its tributaries. Seventeen long term stations are operated and maintained directly by the Rock Island District. Eighteen stations which began in conjunction with the GREAT II program are now being operated and maintained under a cooperative program with the US Geological Survey. Sampling at Monticello, Missouri, on the Middle Fabius River and at Keosauqua, Iowa, on the Des Moines River will begin this year.

Bedload Sampling. Bedload sampling is being conducted at 19 stations located on tributaries of the Mississippi River. At 15 of these stations suspended sediment samples are also collected. At the remaining four stations: the Turkey River at Garber, Iowa; Skunk River at Augusta, Iowa; Rock River at Jefferson, Wisconsin; and the Rock River at Afton, Wisconsin, only bedload samples are collected. Bedload samples are collected during the three peak flows for the year using the Helley Smith bedload sampler. All stations at which bedload samples are collected are operated and maintained in cooperation with the USGS. Records for the bedload stations are also maintained by the USGS.

St. Paul District

A report on the progress and development accomplished in the "Study of Methods Used in Measurement and Analysis of Sediment Loads in Streams", conducted at the St. Anthony Falls Hydraulic Laboratory during the calendar year 1979, is described under "Laboratory and other Research Activities."

Sediment load measurements are currently being made at twenty-three stations sponsored by the St. Paul District. There are sixteen stations in the Upper Mississippi River Basin and seven in the Souris - Red - Rainy Rivers Basin. Eleven of the sediment stations in the Upper Mississippi River Basin will provide basic data for the Great River Study. All sediment load measurements are being conducted by the U. S. Geological Survey under St. Paul District sponsorship.

UPPER MISSISSIPPI REGION

GEOLOGICAL SURVEY

Mississippi Headwaters Subregion

- 1. Suspended-sediment are being collected on a monthly basis at Mississippi River near Royalton, Minn., and at Mississippi River at Naninger, Minn., as a part of the National Stream Quality Accounting Network (NASQAN).
- 2. Suspended-sediment data are being collected on a daily basis at Mississipri River near Anoka, Minn., in cooperation with the U.S. Corps of Engineers.
- 3. Suspended-sediment data are being collected on an intermittent and storm-€vent basis at Crow River at Rockford, Minn., and at Elk River near Big Lake, Minn., in cooperation with the Minnesota Department of Natural Resources, Division of Waters.
- 4. Suspended-sediment measurements were made during floods at the following sites:

Mississippi River at Bemidji, Minn.
Mississippi River below Sandy River at Libby, Minn.
Mississippi River at Aitkin, Minn.
Mississippi River Diversion near Aitkin, Minn.

Minnesota Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Minnesota River at Mankato, Minn., at Whetstone River near Big Stone City, S. Dak., and at Yellow Bank River near Odessa, Minn., in cooperation with the U.S. Corps of Engineers.
- 2. Suspended-sediment data are being collected on a monthly basis at Minnesota River near Jordon, Minn., as a part of NASQAN.
- 3. Suspended-sediment data are being collected on an intermittent or stormevent basis at Watonwan River near Garden City, Minn., Chippewa River near Milan, Minn., and at Yellow Medicine River near Granite Falls, Minn., in cooperation with the Minnesota Department of Natural Resources, Division of Waters.

St. Croix Subregion

1. Suspended-sediment dfta are being collected on a periodic basis at the following sites:

St. Croix River at CTH "T" near Dairyland, Wis. Namekagon River at Hayward, Wis. Namekagon River at Trego, Wis. St. Croix River near Danbury, Wis. Yellow River at Danbury, Wis. Clam River at ice house bridge near Webster, Wis.

Kettle River near Cloverdale, Minn. Snake River near Pine City, Minn. Apple River near Somerset, Wis.

2. Suspended-Sediment data are being collected on a monthly basis at St. Croix River at St. Croix Falls, Wis., as a part of NASQAN.

Upper Mississippi-Black-Root Subregion

- 1. Suspended-sediment data are being collected on a monthly and storm-event basis at North Fork Whitewater River near Elba, Minn., as a part of the National Hydrologic Benchmark Network.
- 2. Suspended-sediment data are being collected on a daily basis at Zumbro River at Kellogg, Minn., at Whitewater River near Beaver, Minn., at Mississippi River at Winona, Minn., at Root River near Houston, Minn., and at South Fork Root River near Houston, Minn., in cooperation with the U.S. Corps of Engineers.
- 3. Suspended and bed load-sediment data are being collected on a periodic and storm-event basis for the U.S. Corps of Engineers, at Chippewa River at Durand, Wis., and at Black River at Galesville, Wis.
- 4. Suspended and bedload sediment data are being collected on an intermittent basis for the U.S. Corps of Engineers, at Plum Creek near Ella, Wis., Chippewa River near Caryville, Wis., and at Chippewa River near Pepin, Wis.
- 5. Suspended-sediment measurements were made of the Mississippi River at LaCrosse, Wis., as part of a project study of Lake Onalaska in cooperation with the U.S. Fish and Wildlife Service.

Upper Mississippi-Maquoketa-Plum Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Upper Iowa River near Dorchester, Iowa, and at Mississippi River at McGregor, Iowa, as a part of the Great River Environmental study in cooperation with U.S. Corps of Engineers, St. Paul District.
- 2. Suspended-sediment data are being collected on a periodic and storm-event basis for the U.S. Corps of Engineers at the Grant River at Burton, Wis.
- 3. Suspended-sediment data are being collected at Maquoketa River near Maquoketa, Ia., as a part of the Great II River Environmental study in cooperation with the U.S. Corps of Engineers, Rock Island District.
- 4. Suspended-sediment data are being collected on an intermittent and storm-event basis at Cedar River near Austin, Minn., in cooperation with the Minnesota Department of National Resources, Division of Waters.
- 5. Suspended-sediment data are being collected three times per year on an event basis at Turkey River at Garber, Iowa, as part of Great II study in cooperation with the U.S. Corps of Engineers, Rock Island District.

Wisconsin Subregion

- 1. Suspended-sediment and bedload data are being collected on a periodic and storm-event basis for the U.S. Corps of Engineers at Wisconsin River at Muscoda, Wis.
- 2. Suspended-sediment data are being collected on a periodic and storm-event basis at the following sites in cooperation with the State of Wisconsin.

Big Eau Pleine River near Stratford, Wis-Fenwood Creek at Bradley, Wis-Freeman Creek at Halder, Wis-Big Eau Pleine River near Mosinee, Wis-

3. Suspended-sediment data are being collected on a periodic and storm-event basis to determine daily suspended-sediment discharge in cooperation with the State of Wisconsin at the following sites:

Site A, Trout Creek near Ridgeway, Wis. Site B, Trout Creek near Ridgeway, Wis. Site D, Trout Creek near Ridgeway, Wis.

- 4. Suspended-sediment data are being collected on an intermittent and stormevent basis in cooperation with Dane County, Wis., at Black Earth Creek at Black Earth, Wis.
- 5. Suspended-sediment data are being collected on a periodic and event-basis to determine daily suspended-sediment discharge in cooperation with the State of Wisconsin, at Yellowstone River near Blanchardville, Wis. and at Steiner Branch near Waldwick, Wis.

Upper Mississippi-Iowa-Skunk-Wapsipinicon Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Mississippi River at Clinton, Iowa, and at Mississippi River at Keokuk, Iowa, as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a daily basis at the following in cooperation with the Iowa Geological Survey:

Iowa River at Iowa City, Iowa Ralston Creek at Iowa City, Iowa Skunk River at Augusta, Iowa

3. Suspended-sediment data are being collected on a daily basis at the following sites as part of the Great II River Environmental study in cooperation with U.S. Corps of Engineers, Rock Island District.

Crow Creek at Bettendorf, Iowa Iowa River at Wapello, Iowa

4. Suspended-sediment data are being collected three times per year on an event basis at Wapsipinicon River at De Witt, Iowa, as part of Great II study in cooperation with the U.S. Crops of Engineers, Rock Island District.

Rock Subregion

- 1. Suspended-sediment data are being collected on a daily plus storm-event basis in cooperation with Dane County, Wis., on Willow Creek at Madisor, Wis.
- 2. Suspended-sediment data are being collected on a weekly and storm-event basis in cooperation with the U.S. Corps of Engineers and the City of Middleton, Wis., at:

Pheasant Branch Creek at Middleton, Wis., at U.S. Highway 12 Pheasant Branch at Century Avenue at Middleton, Wis. Tributary to Pheasant Branch at Hwy. 14 at Middleton, Wis. Tributary to Pheasant Branch at Airport Road at Middleton, Wis. Pheasant Branch at Middleton, Wis., at CTH "M"

3. Suspended-sediment data are being collected on an intermittent and stormevent basis in cooperation with Dane County, Wis., at the following sites:

> Maunesha River near Sun Prairie, Wis. Yahara River at Windsor, Wis. Token Creek near Madison, Wis. Yahara River at STH 113 at Madison, Wis.

Sixmile Creek at Waunakee, Wis.
Sixmile Creek near Waunakee, Wis.
Spring Creek at CTH "M" near Middleton, Wis.
Spring Harbor Storm Sewer at Madison, Wis.
Starkweather Creek - West - at Madison, Wis.
Starkweather Creek - East - at Madison, Wis.
Olbrich Park Storm Ditch at Madison, Wis.
Door Creek near Cottage Grove, Wis.
Mt. Vernon Creek near Mt. Vernon, Wis.

- 4. Suspended-sediment data are being collected on a monthly basis at Rock River near Joslin, Il., as a part of NASQAN.
- 5. At the Kishwaukee River near Perryville, Illinois, daily suspended-sediment data collection began in April 1979 in cooperation with the Rock Island Corps of Engineers.

Des Moines Subregion

1. Suspended-sediment data are being collected on a daily basis at Des Moines River near Saylorville, IA, in cooperation with the Iowa Geological Survey.

- 2. Suspended-sediment data are being collected on a daily basis at Des Moines River at St. Francisville, Mo., as a part of the Great II study in cooperation with the U.S. Corps of Engineers, Rock Island District.
- 3. Suspended-sediment data are being collected on an intermittent basis at Des Moines River at Jackson, Minn., in cooperation with the Minnesota Department of Natural Resources, Division of Waters.
- 4. Suspended-sediment data are being collected on a daily basis at Middle Fork Raccoon River at Bayard, Iowa, and Middle Fork Raccoon River at Panora, Iowa. In conjunction with the operation of these stations, a sediment reservoir sedimentation study is being conducted at Lake Panorama at Panora, Iowa. This study is a cooperative undertaking with the Engineering Research Institute, Iowa State University at Ames, Iowa.

Upper Mississippi-Salt-Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Salt River near New London, Mo., and Mississippi River below Alton, Ill., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on three to six storm-events per year at Middle Fabius River near Monticello, Mo., as a part of the Great II study in cooperation with the U.S. Corps of Engineers, Rock Island Districts.

Upper Illinois Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Illinois River at Marseilles, Ill., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on an intermittent basis at Davis Ditch near Kouts, Ind., Kankakee River near Kouts, Ind., Cobb Ditch near Kouts, Ind., Singleton Ditch at Schneider, Ind., Iroquois River near Rosebud, Ind., and at Iroquois River near Foresman, Ind., in cooperation with the State of Indiana.
- 3. Suspended-sediment data are being collected on a daily basis at Yellow River at Plymouth, Ind., in cooperation with the State of Indiana.
- 4. Suspended-sediment data are being collected on a weekly basis at Kankakee River near North Liberty, Ind., in cooperation with the State of Indiana.
- 5. Bed-material data are being collected on an intermittent basis at Davis Ditch near Kouts, Ind., and at Kankakee River near Kouts, Ind., in cooperation with the State of Indiana.
- 6. Suspended-sediment data are being collected on a daily basis at Iroquois River near Chebanse, Ill., in cooperation with the Illinois Department of Transportation, Division of Water Resources.

7. Suspended-sediment data are being collected on a daily basis at the following sites in cooperation with the Illinois Kankakee River Basin Task Force:

Kankakee River at Momence, Ill. (begun Oct. 1, 1978) Kankakee River near Wilmington, Ill. (begun Oct. 1, 1978) Iroquois River at Iroquois, Ill. (begun Oct. 1, 1978)

8. In cooperation with the Chicago Corps of Engineers daily suspended-sediment data collection began in April 1979 at the Des Plaines River at Riverside, Ill.

Lower Illinois Subregion

1. Suspended-sediment data are being collected on a monthly basis at Illinois River at Valley City, Ill., as a part of NASQAN.

Upper Mississippi-Kaskaskia-Meramec Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Mississippi River at Thebes, Ill., at Kaskaskia River at Venedy Station, Ill., at Big Muddy River at Murphysboro, Ill., and at Meramec River near Eureka, Mo., as a part of NAS QAN.
- 2. Suspended-sediment data area being collected on a daily basis at Kaskaskia River at Cooks Mills, Ill., in cooperation with the U.S. Army Corps of Engineers, St. Louis District.
- 3. Suspended-sediment data are being collected on a daily basis at Mississippi River at St. Louis, Mo., in cooperation with the U.S. Army Corps of Engineers, St. Louis District.

Special Studies

Three stations are operated in cooperation with the Metropolitan Sanitary District of Greater Chicago to record changes in sediment transport during reclamation of strip-mined areas for irrigation with digested sludge from sewage treatment facilities. Two stations on Big Creek, one above the reclamation area at St. David, Ill., and one below the area near Bryant, Ill., monitor changes in sediment load. One station is operated on Slug Run rear Bryant, Ill., which drains an area scheduled to be reclaimed. Annually, size analyses are run on suspended sediment at these stations.

In cooperation with the Rock Island District, Corps of Engineers, daily suspended sediment sampling began at Henderson Creek near Oquawka, Ill, and Green River near Geneseo, Ill. on April 1. At the same time at these stations and at Rock River near Joslin, Ill., sampling began for bed load and bed material sizing during high discharge events. And on December 21, daily suspended sediment sampling began at Edwards River near New Boston, Ill. All these data were gathered for the Sediment and Erosion Work Group of the Great II Mississippi River Basin Study.

In April 1978, in cooperation with Federal Environmental Protection Agency (Energy R&D), six stations were established to determine sediment yield changes from drainage areas affected by coal strip mining. At these locations suspended-sediment samples are being collected monthly with increased sampling during high runoff periods. Three stations: Turkey Creek near Fiatt, South Branch Doza Creek near Lenzburg, Ill., and Little Cana Creek near Creal Springs, Ill., monitor sediment loads from natural drainage areas. The remaining stations: West Branch Big Creek near Canton, Ill., Doza Creek near Lenzburg, Ill., and Bankston Fork near Crab Orchard, Ill., monitor sediment loads from areas affected by strip mining.

Laboratory Activities

The Geological Survey laboratory in Iowa City, Ia., analyzed suspendedsediment samples collected by the Corps of Engineers at:

Mississippi River at Hannibal, Mo. Hadley Creek at Kinderhook, Ill. Bay Creek at Nebo, Ill. Wapsipinicon River at DeWitt, Iowa Iowa River at Marengo, Iowa Iowa River at Coralville Dam, Iowa Mississippi River at Burlington, Iowa South Skunk River below Squaw Creek near Ames, Iowa Mississippi River at Keokuk, Iowa Des Moines River near Stratford, Iowa Raccoon River at Van Meter, Iowa North River near Norwalk, Iowa Middle River near Indianola, Iowa South River near Ackworth, Iowa Des Moines River near Tracy, Iowa White Breast Creek near Dallas, Iowa Mississippi River at East Dubuque, Ill.

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD U.S. Geological Survey P.O. Box 1026 605 North Neil Street Champaign, IL 61820

District Chief, WRD
U.S. Geological Survey
P.O. Box 1230
Federal Building, Room 269
400 South Clinton Street
Iowa City, IA 52244

District Chief, WRD U.S. Geological Survey 1819 North Meridian Street Indianapolis, IN 46202

District Chief, WRD U.S. Geological Survey Post Office Building Room 702 St. Paul, MN 55101 District Chief, WRD U.S. Geological Survey 1400 Independence Road Mail Stop 200 Rolla, MO 65401

District Chief, WRD U.S. Geological Survey 1815 University Avenue Room 200 Madison, WI 53706

UPPER MISSISSIPPI REGION

SOIL CONSERVATION SERVICE

1. Studies of sediment damages and determinations of sediment yields were made in the following watersheds:

a. Public Law 566

Major Drainage	Watershed	Stream	County(s)	State
Mississippi River	Little Wyaconda- Sugar	Little Wyaconda River and Sugar Crk	Scotland Clark Lewis	МО
Rock River	Upper Sugar River	Sugar River	Dane	WI

b. Public Law 639

Major Drainage	Watershed	Stream	County(s)	State
Minnesota River	Yellow Bank	Yellow Bank Crk	Grant Deuel Lac qui Parle	SD MN
Minnesota River	Lac qui Parle	Lac qui Parle	Deuel Brookings Lac qui Parle Yellow Medicine	SD MN
Minnesota River	Yellow Medicine	Yellow Medicine Crk	Lincoln Lyon Yellow Medicine	MN
Minnesota River	Redwood	Redwood Crk	Lincoln Pipestone Lyon Yellow Medicine Redwood	MN
Minnesota River	Cottonwood	Cottonwood Crk	Murray Lyon Redwood Brown Cottonwood	MN

c. River Basin Investigations

Major Drainage	Basin Reported	State
Wisconsin River	Wisconsin River	WI

Suspended sediment and bedload sampling were conducted by the Great River Environmental Action Team, Sediment and Erosion Control Work Group, at the following locations:

River	Location	State
Mississippi	Anoka-Lowry Avenue Bridge	MN
Mississippi	Winona-Burlington-Northern Railroad Bridge	MN
Zumbro	Kellogg	MN
Whitewater	Near Beaver	MN
Root	Near Houston	MN
South Fork Root	Near Houston	MN
Mississippi	McGregor	IA
Iowa	Dorchester	IA
Chippewa	Durand	WI
Black	Near Galesville	WI
Wisconsin	Muscoda	WI

2. Reservoir Sedimentation Surveys

- a. A reservoir sedimentation survey was made on LeRoy Hemish pond in Yellow Medicine County, Minnesota.
- b. A reservoir sedimentation survey was made on Lyle Harris pond in Lyon County, Minnesota.
- c. A reservoir sedimentation survey was made on Mellinthin-Runholt pond in Lyon County, Minnesota.

LOWER MISSISSIPPI REGION

CORPS OF ENGINEERS

Lower Mississippi Valley Division

A draft report "Characterization of the Suspended Sediment Regime and Bed Material Gradation for the Mississippi River Basin" has been completed. The final report is being prepared for publication. This report provides average annual suspended sediment loads for major tributaries and the main stem Mississippi River as well as available information on bed material gradations. It features before and after sediment loads where reservoirs have been constructed and data are available. It also contains general information on land use changes.

Memphis District

Sampling at twenty-four sediment stations established in FY78 on the St. Francis River, Arkansas and its tributaries between Madison, Arkansas and Fisk, Missouri was continued. Suspended sediment, bed sediment, temperature and flow data are being collected on a monthly basis. Suspended sediment samplers DH76TM, DH78, D74ALTM and bed sampler BMH60 were used.

New Orleans District

Sediment Load Measurements

- 1. Suspended sediment and bed material sampling was continued at the ranges located in the Mississippi River at Coochie, La., and at Tarbert Landing, Ms., at a frequency of one per week; in the Old River Outflow Channel near Knox Landing, La., semimonthly; in the Atchafalaya River at Simmesport, La., weekly; monthly at Wax Lake Outlet at Calumet, La., and Lower Atchafalaya River at Morgan City, La. On the Red River samples were taken at Fulton, Ark., and Shreveport, La., weekly while at Alexandria, La., and above Old River Outflow Channel samples were taken semimonthly. Weekly sampling was continued in the Atchafalaya Basin at ranges located at Bayou Chene below Bayou Crook Chene, Lake Long below Bayou La Rompe, Little Tensas below Blind Tensas Cut, and East Access Channel above Chicot Pass.
- 2. Daily suspended sediment samples were taken on the Red River at Colfax, La.
- 3. A cooperative program with the US Geological Survey for collection and analysis of suspended sediment samples was in effect for stations located on the Mississippi River at St. Francisville, Plaquemine, Union, Luling Ferry, Violet, and Venice, La. Samples were taken on the Red River at Boyce and Moncla, La. The sampling frequency was monthly and the data will be published by USGS in its annual publication.

4. Suspended sediment samples were taken with a U.S. P-46, or U.S. P-61 sampler. Bed material samples were taken with a BM-54 sampler or drag bucket type sampler. Daily suspended sediment samples were taken with a trap type sampler.

Office Investigations

- 1. Use of a Digital Flow-Sediment Model of the Atchafalaya Basin developed in conjunction with the Hydrologic Engineering Center is continuing. The model is being used to study alternatives in preparation of the Atchafalaya Basin, Phase I GDM/Feasibility Study. This model is currently being recalibrated using data obtained from the Mississippi Basin Model in Clinton, Mississippi.
- 2. NOD is continuing development of a Flow-Sediment Model of the Mississippi River throughout the District.
- 3. A Flow-Sediment Model of the Red River Waterway is being used to study maintenance dredging associated with the construction sequence and the completed project.
- 4. As part of the LMVD Potamology Program (P-1), WES is compiling a report on the characterization of the suspended-sediment regime and the bed-material composition of the Mississippi River. The study will be completed shortly.
- 5. A Computer Data Base System is being built to store hydrographic data for the period of record in the New Orleans District.
- 6. A Computer Data Base System is being written to analyze, store and retrieve sediment data.
- 7. For NOD, WES is preparing a physical model and a mathematical model of the Atchafalaya Bay.
- 8. NOD, through a contract with LSU and as part of the LMVD Potamology Program, has digitized and stored on computer tape all available hydrograph surveys in the New Orleans District.
- 9. As part of the LMVD Potamology Program, NOD through a contract with University of Missouri-Rolla, is documenting changes in morphological charateristics in the Mississippi and Atchafalaya Rivers.

St. Louis District

A third resurvey of Carlyle Lake was conducted in 1979. This resurvey was required in order to evaluate and determine the accuracy between the computed volume of sediment deposited from the initial sediment survey (1971) and the sediment resurvey (1976). The data analysis has not been completed at this time. However, these results along with a report should be forthcoming this year if there is no higher priority work scheduled.

Sediment and retrogression ranges at both Rend Lake and Lake Shelbyville were surveyed in the spring of 1974. These reports were not submitted during calendar year 1979 due to higher priority work.

Suspended and bed samples were collected at Chester, Illinois, in conjunction with SLD Potamology Study (S-3). This study was completed in March 1979. Data collected during the study included 283 depth-integrated suspended sediment samples and 196 bed samples. River stage fluctuations at Chester, Illinois, during this study ranged from a low of zero to a high of 33 feet, with a corresponding discharge range from 60,000 to 650,000 cfs (Chester gage). Analysis of these data is incomplete at this time.

Vicksburg District

Sedimentation Surveys

- 1. Cross sections and profiles were made on various streams in the Vicksburg District for use in sediment, hydrology, and hydraulic studies and in the design of channel improvements, levees, floodgates, pumps and other flood control and navigation features.
- 2. A study begun in 1978 to determine the amount of sediment deposited in Grenada Reservoir was completed. The study indicates the rate of deposition in the reservoir has increased sufficiently since the last study in 1965; however, only 4% of the total volume in the reservoir has been lost.

Sediment Load Measurements

- 1. In connection with potamology investigations, there are three ranges located on the Mississippi River at Vicksburg, Mississippi; Arkansas City, Arkansas; and Natchez, Mississippi; where both bed samples and suspended sediment measurements are taken weekly.
- 2. For other sedimentation study, suspended sediment, bed material, temperature, discharge and stage were taken intermittently at seventy-one stations on Bayou LaFourche, Bayou Macon, Big Creek, Big Sunflower River, Black River, Boeuf River, Caddo River, Catahoula Diversion Canal, Coldwater River, Connerly Bayou, Ditch Bayou, Hickahala Creek, Little Missouri River, Little River, Little Tallahatchie River, Lower Auxiliary Channel, Macon Lake, Muddy Bayou, Ouatchita River, Panola-Quitman Floodway, Quiver River, Senatobia Creek, Tallahatchie River, Tchula Lake, Tensas Bayou, Tippah River, Tippo Bayou, Yalobusha River, Yazoo Backwater Connecting Channel, Yazoo River and Yocona River.

Other Investigations

- 1. A study was made using the HEC-6 Program on the Tensas River to determine the magnitude of deposition in the channel and the deposition rate for various design alternates. Various dredging intervals were translated for each alternative to determine the most efficient maintenance dredging interval.
- 2. A water sediment model developed to analyze sediment problems in the Yazoo Basin in Mississippi was used to investigate alternatives with which to alleviate the sedimentation problems in the Greenwood bendway in the Yazoo Basin of the alternatives studied the two that produced the most stable channel was (1) a structure in the Greenwood bendway cutoff to distribute flows and sediment through the cutoff and bendway and (2) a plan which would make part of the Yazoo River bendway into a lake. Since both plans perform satisfactorily from a flood control and sediment standpoint they are now being considered from a cost standpoint.
- 3. A study was initiated by the Vicksburg District and Colorado State University to determine possible alternatives for reducing sediment inflow into the main stem Yazoo-Tallahatchie-Coldwater River System from its hill tributaries and to determine design of structural measures to reduce sediment problems. This study should be completed in October 1982.
- 4. A comprehensive data collection program was continued as part of the Yazoo Basin Streambank Erosion Control Evaluation and Demonstration Program. This data collection program has been contracted with the Agricultural Research Service and includes detailed water, sediment, and geology data collection, analysis, and evaluation on selected hill tributaries in the Yazoo Basin.

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LOWER MISSISSIPPI REGION

GEOLOGICAL SURVEY

Lower Mississippi - Hatchie Subregion

- 1. In cooperation with the Tennessee Department of Public Health, Division of Water Quality Control, suspended-sediment discharge measurements are being made on a 6-week frequency at seven sites within the State of Tennessee.
- 2. Suspended-sediment data are being collected on a monthly basis at Mississippi River at Memphis, Tenn., at Obion River at Obion, Tenn., and at Hatchie River at Bolivar, Tenn., as a part of NASQAN.

Lower Mississippi - St. Francis Subregion

1. Suspended-sediment data are being collected on a monthly basis at St. Francis River at Parkin, Ark., St. Francis Bay at Riverfront, Ark., Arkansas River at Dam 2 near Gillette, Ark., and at White River at Clarendon, Ark., as a part of NASQAN.

Lower Mississippi - Yazoo Subregion

1. Suspended-sediment data are being collected on a monthly basis at Mississippi River near Arkansas City, Ark., Yazoo River near Shell Bluff, Miss., and at Yazoo River at Redwood, Miss., as a part of NASQAN.

Lower Red - Ouachita Subregion

1. Suspended-sediment data are being collected on a monthly basis at Ouachita River at Columbia, La., and at Red River near Simmesport, La., and at Ouachita River at Camden, Ark., as a part of NASQAN. Sediment data are being collected on a monthly basis at Big Creek at Pollock, La., as a part of the National Hydrologic Benchmark Network.

Boeuf - Tensas Subregion

1. Suspended-sediment data are being collected on a monthly basis at Tensas River at Tendal, La., and at Boeuf River at Fort Necessity, La., as a part of NASQAN.

Lower Mississippi - Big Black Subregion

1. Suspended-sediment data are being collected on a monthly basis at Mississippi River at Vicksburg, Miss., Big Black at Bovina, Miss., and at Homochitto Creek at Rosetta, Miss., as part of NASQAN.

Lower Mississippi - Lake Maurepas Subregion

1. Suspended-sediment data are being collected on a monthly basis at Amite River at 4-H Camp near Denham Spring, La., Tangipahoa River at Robert, La., Lower Grand River at Bayou Sorrel, La., and at Mississippi River near St. Francisville, La., as a part of NASQAN.

Louisiana Coastal Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Bayou Teche at Keystone Lock and Dam below St. Martinville, La., Mermentau River at Mermentau, La., Atchafalaya River near Melville, La., and at Caleasieu River near Kiner, La., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at the following sites as a part of NASQAN.

Mississippi River at Belle Chasse, La. Tchefuncta River near Covington, La. Houma Navigation Canal at Houma, La.

Special Studies

In cooperation with the Tennessee Department of Transportation, the problem of scour at highway bridges is being investigated at known and potential problem sites across Tennessee. Reports documenting data and research findings are planned.

Monthly collection was begun at 23 stations on the St. Francis River and selected tributaries in October 1977 for the Corps of Engineers. Monitoring is expected to continue for 5 years. Following the 5-year period, the existing network may be reduced to a few stations that would be monitored more intensively.

Suspended-sediment data are collected on a weekly basis and for selected storm events on Tillatoba Creek below Oakland, Miss., and South Fork Tillatoba Creek near Charleston, Miss. This information is collected in cooperation with the U.S. Soil Conservation Service in order to estimate the sediment loads of Tillatoba Creek during periods of high discharge.

Laboratory Activities

The Geological Survey sediment laboratory located in Baton Rouge, La., analyzed suspended-sediment and bed-material samples collected by the U.S. Corps of Engineers at the following locations:

Red River at Alexandria Old River Outflow near Knox Landing Red River above Old River Outflow Mississippi River at Coochie Mississippi River at Tarbert Landing Atchafalaya River at Simmesport
Bayou Chen above Bayou Crook Chen
East Access Channel above Lake Chicot
Lake Long below Bayou LaRompe
Little Tensas below Blind Tensas Cut
Lower Atchafalaya River at Morgan City
Wax Lake Outlet at Calumet

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD U.S. Geological Survey Federal Office Building Room 2301 700 West Capitol Avenue Little Rock, AR 72201

District Chief, WRD U.S. Geological Survey 100 W. Capitol St., Suite 710 Jackson, MS 39201 District Chief, WRD U.S. Geological Survey P.O. Box 66492 6554 Florida Boulevard Baton Rouge, LA 70896

District Chief, WRD U.S. Geological Survey Federal Building and U.S. Courthouse Room A-413 Nashville, TN 37203

SOURIS-RED-RAINY REGION

CORPS OF ENGINEERS

North Central Division

St. Paul District

Sediment loads were measured by the US Geological Survey at seven river stations (Wild Rice, two at Sheyenne, two at Pembina, Souris and Little South Pembina Rivers) under the St. Paul District sponsorship.

SOURIS-RED-RAINY REGION

GEOLOGICAL SURVEY

Souris Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Souris River near Sherwood, N. Dak., as part of the Waterways Treaty program with the U.S. Department of State.
- 2. Suspended-sediment data are being collected on a monthly basis at Souris River near Foxholm, N. Dak., in connection with a pre-impoundment quality water study in cooperation with the U.S. Corps of Engineers.
- 3. Suspended-sediment data are being collected on a monthly basis at Souris River near Westhope, N. Dak., as part of the National Stream Quality Accounting Network (NASQAN).
- 4. Suspended-sediment data are being collected on a monthly basis at Souris River near Verendrye, N. Dak., and at Wintering River near Karlsruhe, N. Dak., as part of the Missouri River Basin program.
- 5. Suspended-sediment data are being collected on a monthly basis at West Branch Short Creek near Columbus, N. Dak., as part of the Coal Hydrology Program.

Red Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Sheyenne River at Lisbon, N. Dak., (discontinued Sept. 30, 1979), and at Sheyenne River at Kindred, N. Dak., in connection with a pre-impoundment study in cooperation with the U.S. Corps of Engineers.
- 2. Suspended-sediment data are being collected on a monthly basis at Wild Rice River near Abercrombie, N. Dak., and at Red River of the North at Hickson, N. Dak., as part of the Missouri River Basin program.
- 3. Suspended-sediment data are being collected on a monthly basis at Beaver Creek near Finley, N. Dak., as a part of the National Hydrologic Benchmark Network.
- 4. Suspended-sediment data are being collected on a monthly basis at Red River of the North at Halstad, Minn., and at Red River of the North at Emerson, Manitoba, Canada, and at the Redlake River at Crookston, Minn., as a part of NASQAN.
- 5. Suspended-sediment data are being collected at Pembina River near Vang, N. Dak., (discontinued Sept. 30, 1979), at Little South Pembina River near Walhalla, N. Dak., (discontinued Sept. 30, 1979), and at Pembina River near Walhalla, N. Dak., in cooperation with the U.S. Corps of Engineers.

- 6. Suspended-sediment data are being collected on an intermittent basis at Buffalo River near Dilworth, Minn., in cooperation with the Minnesota Department of Natural Resources, Division of Waters.
- 7. Suspended-sediment data are being collected on a daily basis at Wild Rice River at Twin Valley, Minn., in cooperation with the U.S. Corps of Engineers.
- 8. Suspended-sediment measurements were made during floods at the following sites:

Wild Rice River above Ada, Minn. So. Br. Wild Rice River near Felton, Minn. So. Br. Wild Rice near Borup, Minn. Wild Rice River near Perley, Minn. Wild Rice River above So. Br. near Borup, Minn. State Ditch 45 near Felton, Minn. Wild Rice River at Hendrum, Minn. Marsh River near Shelly, Minn. Marsh River Ditch near Ada, Minn. Sandhill River near Climax, Minn. Red Lake River at Highlanding near Goodridge, Minn. Thief River near Thief River Falls, Minn. Ruffy Brook near Gonvick, Minn. Clearwater River at Plummer, Minn. Lost River at Oklee, Minn. Clearwater River at Red Lake Falls, Minn. Snake River at Warren, Minn. Snake River at Alvarado, Minn. Middle River at Argyle, Minn. So. Br. Two Rivers at Lake Bronson, Minn. Two Rivers at Hallock, Minn. Roseau River below S. Fork near Malung, Minn. Roseau River below Roseau, Minn. Sprague Creek near Sprague, Manitoba Roseau River at Ross, Minn.

Rainy Subregion

1. Suspended-sediment data were collected on a monthly basis at Little Fork River at Littlefork, Minn., at Roseau River below State Ditch 51 near Caribou, Minn, at Red Lake River near Crookston, Minn., and at Rainy River at Manitou Rapids, Minn., as a part of NASQAN.

Special Studies

Suspended-sediment data were collected during periods of high flow at four sites in the Park River basin, N. Dak., in cooperation with the U.S. Soil Conservation Service.

9. Suspended-sediment measurements were made during floods at the following sites:

Sturgeon River near Chisholm Minn. Rapid River near Baudette, Minn.

For additional information about Geological survey activities within this region, contact the following offices:

District Chief, WRD U.S. Geological Survey Post Office Building, Room 702 St. Paul, MN 55101 District Chief, WRD U.S. Geological Survey 821 East Interstate Avenue Bismarck, ND 58501

SOIL CONSERVATION SERVICE

1. Special Study

Suspended sediment samples are being collected under contract by the USGS on the North Branch of the Park River watershed in Cavalier, Pembina, and Walsh Counties, North Dakota.

MISSOURI BASIN REGION

CORPS OF ENGINEERS

Missouri River Division

Kansas City District

<u>Suspended Sediment Measurements</u>. The Kansas City District operated 22 suspended sampling stations during this calendar year.

- 1. There are three long term stations on the Missouri River, St. Joseph, Kansas City, and Herman, Missouri. At these stations DI's are collected each week and a full set of points each month. Bed material samples are collected each time a suspended sample is taken.
- 2. On the main stem of the Kansas River, seven stations are presently operated. Three are quasi long term stations, i.e., different agencies have collected with one or two year gaps between period of continuous sampling and/or a station has been moved due to loss in channel control. The three stations are Wamego, Lecompton, and DeSoto, Kansas. The four other stations are short term and will be discontinued at the end of the Bank Stabilization Study or just prior to its completion. One tributary at Eudora, Kansas, is included in these temporary special data collection stations.
- 3. The remaining stations are for more routine data collections, such as reservior inflows/outflow trap efficiency, gross density, storage allocation for sediment, etc.
- 4. One station at Warsaw, Missouri, is being utilized for a downstream erosion study in relation to hydropower releases as well as sediment record. A turbidity suspended sediment relationship is being attempted both with DI's and surface samples. Additional samples, both surface and DI's, have been used for water chemistry to determine salts that can be used to compute the SAR of the eroding fluid.

Lake Sedimentation Investigations. The initial resurvey reports for Tuttle Creek, Pomona, and Pomme de Terre Lakes are still pending and will be finalized when other special studies with higher priority are completed. Perry Lake sedimentation and degradation ranges have been resurveyed and are being compiled and plotted. An inflow measurement station is being continued until insitu lake data can be performed (cores, density, etc.). Preliminary advance range monument location was initiated by the Survey Section at Milford and Rathburn Lakes. Survey are being conducted presently at Rathburn Lake. Some surveying work at the following lakes is still pending; however, most of these ranges are in the flood pools and are awaiting easement negotiation.

Smithville Lake

Special Studies.

1. Kansas River

- (a) The bank stabilization study is continuing. Little data were collected this past year because of other studies. However, data collected included cross section surveys and bed materials at key ranges for input into HEC 6 in order to reconsititute observed phenomena. Results to date are not conclusive. A contract was let to HEC to modify HEC 6 for mechanical removal of bed materials (dredging). It is understood that this mod is nearing completion and will be received in the near future.
- (b) The navigation study for the lower Kansas is continuing between the mouth and Turner. Bed materials and water samples were taken for elutriate testing and delivered to the EPA and Division laboratories. The labortories have completed their testing, but the final results are unknown at present.

2. Sac River

- (a) In August, monitoring downstream for a complete hydropower release cycle was conducted again. Data were collected at 30± minute intervals continuously from the initial rise in stage through the crest until a noticeable decrease in stage occurred on the back side of the hydrograph. The primary location of these data collections was performed at Highway J where DI's, points, and velocities were taken. Other data were collected below the outlet works, above and below the cutoff, and downstream at Caplinger Mills (nr) (a rated station). Sediment concentration and turbidity analysis correlations will be made at all these downstream stations.
- (b) Attempts were made to determine withdrawal velocities in Stockton Lake immediately above the weir during power generation. Circular current patterns observed coupled with the low velocities measured throughout the vertical raised more questions about the methodology, equipment used, and hydrodynamics than the intended purpose of the data collected. Neither a 100# P-61 weight nor the Price current meter would align themselves in a particular direction to indicate streamlining, rather these pieces of equipment rotated randomly very slowly clockwise and then counter. No recognizable period of oscillation was deteted.
- 3. Osage River. (Downstream HST DAM). A considerable amount of data was collected for a distance of 40 to 45 miles downstream of the dam. These data were collected for a contractor to be used in his evaluation of potential bed and bank erosion, turbidity attenuation or dampening due to power releases. Early in the year, velocity

distributions were made, both longitudinal and laterally, water surface elevations measured for development of water surface profiles, suspended sediment samples were collected both insitu longitudinally and an increased sampling was made at the Warsaw gage. Water samples were collected for testing soil samples and chemistry ion analyzed. Bed and bank materials were sampled, bed fluff measurements were made, longitudinal bed profiles were sounded along with attempts to measure insitu densities and take multidepth soundings. New cross sections were laid out and surveyed. Surveys were made of the existing Union Electric ranges both along the main stem and in the tributaries. A contractor's study of the sedimentation and erosion potential should be forthcoming in April 1980.

4. Missouri River. A month of effort and manpower was extended in sediment and velocity data collection in an attempt to aid Operations Division with the testing and evaluation of the "Elsie M." The "Elsie I" is a modified LCM with hydraulic deflector plates added to deflect the twin screw prop wash in a downward direction to the bed and scour bed materials. A considerable amount of testing was conducted in an off channel area in an attempt to determine the most effective method of operation. Data collected consisted of suspended sediments, bed materials, and velocity distribution prior to the testing, and suspended sediments and velocity during the tests. An evaluation report is being prepared by the Operations Division at this time.

Omaha District

Sediment Load Measurements. The measurement and computation of suspended sediment load records were continued at eight stations. Of these, two are Missouri River mainstem stations, four are major tributary stations and two are minor tributary stations. The U.S. Geological Survey operates the four major and two minor tributary stations under a cooperative stream gaging program which includes computation and publication of sediment load records. In addition, with the Corps' assistance, they collect suspended and bed sediment samples, including flow velocities in the Missouri River at Nebraska City, Nebraska; Omaha, Nebraska; Sioux City, Iowa and Ponca, Nebraska and two new stations at Maskell, Nebraska and Gayville, South Dakota. The data include five to seven point integrated samples per stream vertical at a minimum of five vertical locations in the channel cross-section; as well as one bed sample of each vertical using a BM-54 sampler. The sampling data, including the velocity measurements, are obtained from a boat at each station at about six week intervals during the open water season. It is intended that this data will be used to document the bed material load being transported by the Missouri River. The Corps operates PS-69 automatic samplers at the two minor tributary stations in the Omaha Metropolitan area. Suspended sediment load records for stations operated under the cooperative program are published annually in the USGS Water Data reports.

Reservoir Sedimentation Activities.

- 1. Garrison Project. The resurvey of the Garrison aggradation reach started in 1978 was completed.
- 2. Gavins Point Project. A complete sedimentation resurvey was made of the degradation reach below Gavins Point Dam. Observations included profiling of all degradation ranges and bed surface sampling to determine degradation and/or armoring trends and bank erosion in the reach. This resurvey, originally scheduled for 1981, was moved ahead to 1979 in order to provide field survey data for use in a dye study to determine the mixing characteristics of Lewis and Clark Lake.
- 3. Big Bend Project. A complete sedimentation resurvey was made of the aggradation reach above Big Bend Dam. Observations included profiling all aggradation ranges and collection of bed material and suspended sediment samples in the headwater reach. The reservoir resurvey data will be used to update water volume and sediment accumulation values.
- 4. Oahe Project. A complete sedimentation resurvey was made of the degradation reach below Oahe Dam.

Other Investigations.

- 1. Missouri River bed surface samples were gathered in conjunction with Kansas City personnel along the 750 miles of river from Ponca, Nebraska to St. Louis, Missouri. The channel bed was sampled every 5 miles at 5 to 7 lateral positions. A size gradation determination for each sample is being performed at the Missouri River Division Laboratory.
- 2. Two new sediment sampling stations were established in the "Wild and Scenic River" reach of the Missouri River between Gavins Point Dam and Ponca, Nebraska as part of the 1979 F.Y. Cooperative Stream Gaging Program with the USGS. The new sites are located near Gayville and Maskell, Nebraska. An additional site was also re-established at Sioux City, Iowa. The sampling effort at the new sites will require conjunctive point and velocity measurements, bed samples, and discharge measurements from a boat at about four to six week intervals during the open water season.
- 3. The first phase of the Missouri River Degradation Study, begun in 1978, was completed and is being finalized into draft report form. As part of the study objective to assess the ultimate level of degradation in the river reach extending from Gavins Point Dam to the Platte River confluence, major study items included transient impacts of river channel bend cutoffs, channel stabilization works, changed flow regime and degradation impacts of the dam construction. Concurrent investigations of stage-discharged rating curve trends, spatial and temporal changes in water surface slopes, and changes in channel flow roughness were also made. Continued efforts will be made during the coming year to assess the time rate of degradation and evaluate the feasibility of alternative solutions to adverse impacts.

- 4. A study was conducted in conjunction with a proposed Section 22 action to determine the feasibility of dredging Wall Lake, in South Dakota, to improve lake water quality conditions.
- 5. A contract was initiated with Dr. Khalid Mahmood at Rockville, Maryland to interpret and analyze digital data obtained in a test of a multi-channel bed profiler. In general, the work will consist of a reassessment of sediment movement in the Missouri River and a comparison against theoretical transport functions.
- 6. A report was published entitled "Sediment Transport Relationships." It presents a new sediment transport program for computing the total sand load based on data collected from a comprehensive Missouri River sediment and flow data collection program.
- 7. A dye study was conducted, under contract by the Sutron Corporation, of the Missouri River Reach from Fort Randall Dam to Sioux City, Iowa. Work Items included coordinating the data collection, injecting the dye, collecting samples and supporting hydrologic data, analyzing dye samples and preparing a report of the findings. Data gathered will be used to:
- (a) Modify the two-dimensional mathematical model for mixing processes in the Missouri River (previously developed by Sutron, Inc.) to apply to the waters below Gavins Point Dam. Emphasis will be given to modeling flows around islands.
- (b) Modify the dimension requirements of the two-dimensional mixing model to apply to conditions in Lewis and Clark Lake. This will require increasing the grid size in the lateral direction from 10 to 100 grid points, permitting the use of streamlines as grid lines, and including algorithms to model the transport and deposition of the finer grain size sediments.
- 8. Several reports and letters were written concerning shoreline erosion along mainstem project boundaries. Problems addressed included:
- (a) Design of protective measures for preservation of an archaeological site along the shore of Lake Oahe.
- (b) Design of protective revetment for a private development in danger of encroachment by Lake Oahe.

MISSOURI REGION

GEOLOGICAL SURVEY

Saskatchewan Subregion

1. Suspended-sediment data are being collected on a monthly basis at St. Mary's River at Montana, U.S.A.--Alberta, Canada border, as a part of the National Stream Quality Accounting Network (NASQAN).

Missouri-Marias Subregion

- 1. Suspended-sediment data are being collected on a daily basis at two sites on Muddy Creek near Vaughn, Mont., to monitor irrigation practices.
- 2. Suspended-sediment data are being collected on a monthly basis at Missouri River at Toston, Mont., and at Marias River near Chester, Mont., as a part of NASQAN.

Missouri - Musselshell Subregion

- 1. Suspended-sediment data are being collected on a daily basin at Missouri River near Landusky, Mont., in cooperation with the U.S. Corps of Engineers.
- 2. Suspended-sediment data are being collected on a monthly basis at the following as a part of NASQAN:

Missouri River at Virgelle, Mont.
Musselshell River at Mosby, Mont.
Missouri River below Fort Peck Dam, Mont.

3. Suspended-sediment data are being collected on a monthly basis at the following sites in cooperation with the Bureau of Land Management:

Rehder Coulee near Klein, Mont. Half Breed Creek near Klein, Mont. Musselshell River near Roundup, Mont. East Parrot Creek near Roundup, Mont. West Parrot Creek near Roundup, Mont. Fattig Creek near Delphia, Mont.

4. Suspended-sediment data are being collected periodically at Crow Rock Creek near Cohagen, Mont., as part of Coal Hydrology program.

Milk Subregion

I. Suspended-sediment data are being collected on a monthly basis at Milk River at Nashua, Mont., as a part of NASQAN.

- 2. Suspended-sediment data are being collected on a quarterly basis at Little Peoples Creek near Hays, Mont., and Boxelder Creek near Rocky Boy, Mort., as part of the Federal CBR program.
- 3. Suspended-sediment data are being collected on a monthly basis at Fock Creek below Horse Creek at the international boundary, as a part of the National Hydrologic Benchmark Network.

Missouri - Poplar Subregion

- I. Suspended-sediment data are being collected on a monthly basis at Fedwater River at Circle, Mont., and at Redwater Creek near Vida, Mont., as a part of the Federal CBR program.
- 2. Suspended-sediment data are being collected on a monthly basis at East Poplar River at international boundary in cooperation with the Department of State (International Joint Commission).
- 3. Suspended-sediment data are being collected on a monthly basis at the following sites to define water quality characteristics of the Poplar River Basin in cooperation with the Environmental Protection Agency:

Poplar River at international boundary East Fork Poplar River near Scobey, Mont. Poplar River above West Fork near Bredette, Mont. West Fork Poplar River near Bredette, Mont. Poplar River near Poplar, Mont.

- 4. Suspended-sediment data are being collected on a monthly basis at Missouri River near Culbertson, Mont., as a part of NASQAN.
- 5. Suspended-sediment data are being collected on a monthly basis at fig Muddy Creek near Antelope, Mont., as part of the Federal CBR program.

Upper Yellowstone Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Yellow-stone River at Billings, Mont., as a part of the Federal CBR program.
- 2. Suspended-sediment data are being collected on a monthly basis at Yellow-stone River at Huntley, Mont., in cooperation with the Environmental Protection Agency.
- 3. Suspended-sediment data are being collected on a monthly and storm-event basis from March to October at Big Sand Coulee at Montana-Wyoming State Line, in cooperation with the U.S. Bureau of Land Management.
- 4. Suspended-sediment data are being collected on a monthly basis at Yellowstone River near Livingston, Mont., as part of NASQAN.

Big Horn Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Bighorn River at Bighorn, Mont., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly and storm-event basis at East Fork Wind River near Dubois, Wyo, in cooperation with the U.S. Bureau of Indian Affairs.
- 3. Suspended-sediment data are being collected on a monthly and storm-event basis at Wind River near Crowheart, Wyo., at Nowood River near Tensleep, Wyo., and at Shoshone River near Lovell, Wyo., in cooperation with the Wyoming State Engineer.
- 4. Suspended-sediment data are being collected on a daily basis at the following sites, in cooperation with the U.S. Bureau of Land Management:

Dry Creek near Bonneville, Wyo. East Fork Nowater Creek near Calter, Wyo. Fifteenmile Creek near Worland, Wyo.

- 5. Suspended-sediment data are being collected on a quarterly basis at Bighorn River at Kane, Wyo., as a part of the Missouri River Basin Program.
- 6. Suspended-sediment data are being collected on a weekly basis during irrigation season at Wyoming Canal near Lenore, Wyo., and at Wyoming Canal below Pilot Wasteway near Morton, Wyo., in cooperation with the U.S. Bureau of Reclamation, Upper Missouri Region.
- 7. Suspended-sediment data are being collected on a quarterly basis at Middle Fork Fifteenmile Creek near Worland, Wyo., in cooperation with the Bureau of Land Management.
- 8. Suspended-sediment data are being collected on a monthly and storm-event basis at Fivemile Creek near Shoshoni, Wyo., as a part of the Missouri River Basin program.

Powder-Tongue Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Tongue River at Brandenberg Bridge, Mont., at Tongue River at Miles City, Mont., and at Powder River at Locate, Mont.
- 2. Suspended-sediment data are being collected on a daily basis during spring runoff and summer periods at Powder River at Moorhead, Mont., and at Powder River at Broadus, Mont.
- 3. Suspended-sediment data are being collected on a monthly basis at Tongue River at Birney Day School Bridge near Birney, Mont., in cooperation with the Environmental Protection Agency.

4. Suspended-sediment data are being collected on a monthly storm-event basis at the following sites in cooperation with the Wyoming State Engineer:

Goose Creek below Sheridan, Wyo. Little Powder River above Dry Creek, near Weston, Wyo.

- 5. Suspended-sediment data are being collected on a daily basis at Powder River at Arvada, Wyo., in cooperation with the U.S. Bureau of Land Management.
- 6. Suspended-sediment data are being collected on monthly storm-event basis at Clear Creek near Arvada, Wyo., in cooperation with the U.S. Bureau of Land Management.
- 7. Suspended-sediment data are being collected on a monthly storm-event basis at the following sites in connection with the Federal CBR program:

Salt Creek near Sussex, Wyo.

Powder River near Sussex, Wyo.

Crazy Woman Creek at upper station, near Arvada, Wyo.

Clear Creek below Rock Creek, near Buffalo, Wyo.

Clear Creek at Ucross, Wyo.

Little Powder River below Corrall Creek, near Weston, Wyo.

Little Powder River near Weston, Wyo.

8. Suspended-sediment data are being collected on a monthly basis in cooperation with the Bureau of Land Management:

Spring Creek near Decker, Mont. Squirrel Creek near Decker, Mont. Tongue River at Tongue River Dam, near Decker, Mont. Prairie Dog Creek near Birney, Mont. Hanging Woman Creek at state line, near Otter, Mont. Waddle Creek near Otter, Mont. Trail Creek near Otter, Mont. East Trail Creek Otter, Mont. Corral Creek near Otter, Mont. Horse Creek near Birney, Mont. Hanging Woman below Horse Creek, near Birney, Mont. Hanging Woman Creek near Birney, Mont. Otter Creek near Otter, Mont. Otter Creek below Fifteen Mile Creek, near Otter, Mont. Home Creek near Ashland, Mont. Otter Creek at Ashland, Mont. Pumpkin Creek near Miles City, Mont. Mizpah Creek ner Mizpah, Mont. Locate Creek near Ismay, Mont.

9. Suspended-sediment data are being collected daily, March through September, at Powder River at Moorhead, Mont., and Powder River at Broadus, Mont., as part of the Federal CBR program.

Lower Yellowstone Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Yellow-stone River near Sidney, Mont., in cooperation with the U.S. Corps of Engineers.
- 2. Suspended-sediment data are being collected on a daily basis at Yellow-stone River at Forsyth, Mont.
- 3. Suspended-sediment data are being collected on a monthly basis at the following sites in cooperation with the U.S. Bureau of Land Management:

Sarpy Creek near Hysham, Mont.
East Fork Armelles Creek near Colstrip, Mont.
Armelles Creek near Forsyth, Mont.
Rosebud Creek at reservation boundary near Kirby, Mont.
Rosebud Creek near Colstrip, Mont.
Cow Creek near Colstrip, Mont.
Snyder Creek near Brandenburg, Mont.
Rosebud Creek at mouth, near Rosebud, Mont.
Cherry Creek near Terry, Mont.
Glendive Creek near Glendive, Mont.
Cottonwood Creek near Intake, Mont.
Beaver Creek near Wibaux, Mont.

- 4. Suspended-sediment data are being collected on a monthly basis at Yellowstone River near Miles City, Mont., and Yellowstone River near Terry, Mont., in cooperation with the Environmental Protection Agency.
- 5. Suspended-sediment data are being collected on a periodic basis for coal hydrology investigations at the following sites:

Muster Creek near Kinsey, Mont. Custer Creek near Kinsey, Mont. O'Fallon Creek near Ismay, Mont. Clear Creek near Hoyt, Mont. Upper Sevenmile Creek near Lindsay, Mont. Deer Creek near Glendive, Mont.

Missouri-Little Missouri Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Missouri River near Williston, N. Dak., in cooperation with the Environmental Protection Agency.
- 2. Suspended-sediment data are being collected on a monthly basis at Bear Den Creek near Mandaree, N. Dak., as part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected on a monthly basis at Little Missouri River near Watford City, N. Dak., as part of NASQAN.

4. Suspended-sediment data are being collected on a monthly basis at the following sites as part of the Coal Hydrology program:

Stony Creek near Williston, N. Dak. Beaver Creek near Ray, N. Dak. Deep Creek near Amidon, N. Dak. Beaver Creek near Trottlers, N. Dak.

Cheyenne Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Belle Fourche River near Elm Springs, S. Dak., and at Cheyenne River at Cherry Creek, S. Dak, as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at Castle Creek above Deerfield Dam, near Hill City, S. Dak., as a part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected on a monthly and storm-event basis at Red Water Creek at Wyoming South Dakota State line in cooperation with the Wyoming State Engineer.
- 4. Suspended-sediment data are being collected on a monthly and storm-event basis at Cheyenne River near Dull Center, Wyo., as a part of the Federal energy program.
- 5. Suspended-sediment data are being collected on a monthly and storm-event basis at Dry Fork Cheyenne River near Bill, Wyo., at Belle Fourche River below Moorcraft, Wyo., and at Lance Creek near Riverview (formerly known as near Spencer, Wyo.), Wyo., in cooperation with the U.S. Bureau of Land Management.
- 6. Suspended-sediment data are being collected on a daily basis at Belle Fourche River below Rattlesnake Creek, near Piney, Wyo., and at Belle Fourche River above Dry Creek, near Piney, Wyo., in cooperation with the U.S. Bureau of Land Management.
- 7. Suspended-sediment data are being collected on a monthly storm-event basis at the following sites as part of the Federal energy program:

Antelope Creek near Teckla, Wyo. Lodgepole Creek near Hampshire, Wyo. Little Thunder Creek near Hampshire, Wyo. Caballo Creek at mouth, near Piney, Wyo. Raven Creek near Moorcraft, Wyo. Donkey Creek near Moorcraft, Wyo.

Missouri-Oahe Subregion

1. Suspended-sediment data are being collected on a monthly basis at Spring Creek near Zap, N. Dak., in cooperation with the U.S. Environmental Protection Agency.

- 2. Suspended-sediment data are being collected on a monthly basis at Knife River at Hazen, N. Dak., at Grand River at Little Eagle, S. Dak., at Moreau River near Whitehorse, S. Dak., at Heart River near Mandan, N. Dak., and at Cannonball River at Breien, N. Dak., as a part of NASQAN.
- 3. Suspended-sediment data are being collected at Missouri River at Bismarck, N. Dak., in cooperation with the U.S. Corps of Engineers.
- 4. Suspended-sediment data are being collected on a monthly basis at Apple Creek near Mehoken, N. Dak., as part of the Missouri River Basin program.
- 5. Suspended-sediment data are being collected on a monthly basis during periods of flow at the following sites as part of the Coal Hydrology program:

Knife River at Manning, N. Dak. Stray Creek near Manning, N. Dak. Knife River at Marshall, N. Dak. Elm Creek near Golden Valley, N. Dak. Coyote Creek near Zap, N. Dak. Brush Creek near Beulah, N. Dak. Spring Creek below Lake Ilo at Dunn Center, N. Dak. Spring Creek near Halliday, N. Dak. Antelope Creek above Hazen, N. Dak. Antelope Creek Tributary near Hazen, N. Dak. Coal Creek near Stanton, N. Dak. Alderin Creek near Fort Clark, N. Dak. Missouri River Tributary 2 near Hensler, N. Dak. Coal Lake Cl near Hensler, N. Dak. Buffalo Creek near Washburn, N. Dak. Square Butte Creek near Hannover, N. Dak. Square Butte Creek above Nelson Lake near Center, N. Dak. Hagel Creek near Center, N. Dak. Norwegian Creek near Belfield, N. Dak. S Branch Heart River near South Heart, N. Dak. North Creek near South Heart, N. Dak. Heart River near South Heart, N. Dak. Green River near New Hradec, N. Dak. Cannonball River at New England, N. Dak. Coal Bank Creek near Havelock, N. Dak. Cannonball River at Regent, N. Dak. Timber Creek near Bentley, N. Dak. Buffalo Creek Tributary near Gascoyne, N. Dak.

Missouri- White Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Missouri River at Pierre, S. Dak., and at Missouri River below Ft. Randall Dam, S. Dak., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a daily basis at Bad River near Ft. Pierre, S. Dak., in cooperation with the U.S. Corps of Engineers.

Niobrara Subregion

1. Suspended-sediment data are being collected on a daily basis at Niobrara River near Verdel, Nebr., in cooperation with the U.S. Corps of Engineers, and as part of NASQAN.

James Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at James River near Scotland, S. Dak., and at James River near Columbia, S. Dak. as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at James River at LaMoure, N. Dak., and at James River near Columbia, S. Dak.

Missouri - Big Sioux Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Big Sioux River at Akron, Iowa, as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at Big Sioux River near Dell Rapids, S. Dak.
- 3. Suspended-sediment data are being collected six times a year on the Missouri River near Gayville, S. Dak., Missouri River near Maskall, Nebr., and Missouri River near Ponca, Nebr., in cooperation with the U.S. Corps of Engineers.

North Platte Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Buffalo Creek near Hebron, Colo., at Grizzly Creek near Spicer, Colo. at Grizzly Creek near Hebron, Colo., at Little Grizzly Creek above Coalmont, Colo., and Little Grizzly Creek above Hebron, Colo. in cooperation with Jackson County, Colo.
- 2. Suspended-sediment data are being collected on a daily basis at Canadian River near Lindland, Colo., and at Canadian River near Brownlee, Colo., as a part of the Federal CBR program.
- 3. Suspended-sediment data are being collected on a monthly basis at North Platte River near Lisco, Nebr., as part of NASQAN.
- 4. Suspended-sediment data are being collected on a monthly basis at Encampment River above Hog Park Creek, near Encampment, Wyo, as a part of the National Hydrologic Benchmark Network.

5. Suspended-sediment data are being collected on a monthly and storm-event basis at the following stations in cooperation with the Wyoming State Engineer:

Little Medicine Bow River near Medicine Bow, Wyo.
Medicine Bow River above Seminoe Reservoir, near Hanna, Wyo.
Sweetwater River near Alcova, Wyo.
North Platte River at Casper, Wyo.
North Platte River at Orin, Wyo.
Laramie River near Fort Laramie, Wyo.
North Platte River at Wyoming - Nebraska State line

6. Suspended-sediment data are being collected on a monthly and storm-event basis at the following stations in cooperation with the U.S. Bureau of Land Management:

Sage Creek near Saratoga, Wyo. Big Ditch near Coyote Springs, Wyo. North Ditch near Coyote Springs, Wyo. Hannah Draw near Hanna, Wyo.

- 7. Suspended-sediment data are being collected on a monthly basis at Sand Creek near Glenrock, Wyo., for the Federal CBR program.
- 8. Suspended-sediment data are being collected on a daily basis from April through September at North Platte River at Orin, Wyo., (in addition to monthly and storm-event sampling), at North Platte River below Guernsey Reservoir, Wyo., and at North Platte River below Whalen Diversion Dam, Wyo., in cooperation with the Wyoming State Engineer.

South Platte Subregion

- 1. Suspended-sediment data are being collected on a daily basis during the irrigation season April thru October at South Platte River near Weldona, Colo., starting April 1977, and bi-monthly at 15 sites on irrigation canals in the Weldona, Colo., area. This activity was in cooperation with the U.S. Bureau of Reclamation, Lower Missouri River Basin Region (discontinued September 30, 1979).
- 2. Suspended-sediment data are being collected on a monthly basis at South Platte River at Julesburg, Colo., as a part of NASQAN.
- 3. Suspended-sediment data are being collected on a monthly basis at Tarryall Creek near Jefferson, Colo., as part of the Federal CBR program.
- 4. Suspended-sediment data are being collected on a monthly basis at the following sites in cooperation with the Lefthand St. Vrain Water Conservation District.
 - St. Vrain Creek at Lyons, Colo. Lefthand Creek at mouth, at Longmont, Colo. St. Vrain Creek below Longmont, Colo.

Platte Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Platte River near Duncan, Nebr., as part of NASQAN.
- 2. Suspended-sediment data are being collected on a miscellaneous basis at Mill Creek at Louisville, Nebr., and Cedar Creek near Louisville, Nebr., and at Four-mile Creek near Plattsmouth, Neb., in cooperation with the Nebraska Department of Water Resources.
- 3. Suspended-sediment data are being collected on a daily basis at Platte River at Louisville, Nebr., in cooperation with the U.S. Corps of Engineers, Omaha District, and as part of NASQAN.
- 4. Suspended-sediment data are being collected on a monthly basis at Salt Creek at Greenwood, Nebr., and on an intermittent basis at Rock Creek near Ceresco, Nebr., in cooperation with the Nebraska Natural Resources Commission.
- 5. Suspended-sediment data are being collected on a miscellaneous basis at Platte River at North Bend, Nebr., in cooperation with the Nebraska Natural Resources Commission.

Loup Subregion

1. Suspended-sediment data are being collected on a monthly basis at Loup River near Genoa, Nebr., as part of NASQAN.

Elkhorn Subregion

1. Suspended-sediment data were collected through September 30, 1979, on an intermittent basis during periods of high flow at Elkhorn River near Norfolk, Nebr., on a miscellaneous basis at Elkhorn River at Waterloo, Nebr., and Logan Creek at Pender, Nebr., in cooperation with the Nebraska Natural Resources Commission.

Missouri - Little Sioux Subregion

1. Suspended-sediment data which includes bed-material, suspended-sediment samples, and velocities at several points in a vertical, are being collected at the following stations in cooperation with the Corps of Engineers, Omaha District:

Missouri River near Ponca, Nebr. (replaces site near Sioux City, Iowa) Missouri River at Omaha, Nebr. Missouri River at Nebraska City, Nebr.

2. Suspended-sediment data are being collected at Missouri River at Sioux City, Iowa, and Missouri River at Omaha, Nebr., as a part of NASQAN.

Missouri - Nishnabotna - Subregion

- 1. Suspended-sediment data are being collected on a periodic basis at Walnut Creek near Fairview, Kans., Walnut Creek near Hamlin, Kans., Walnut Creek at Reserve, Kans., Wolf River at Hiawatha, Kans., Buttermilk Creek near Willis, Kans., Wolf River at Leona, Kans., Wolf River near Sparks, Kans., and at Wolf River southwest of Hiawatha, Kans., in cooperation with the U.S. Soil Conservation Service.
- 2. Suspended-sediment data are being collected on a daily basis at Nodaway River at Clarinda, Iowa, in cooperation with the Iowa Geological Survey.
- 3. Suspended-sediment data are being collected on a monthly basis at Platte River at Sharps Station, Mo., and Missouri River at St. Joseph, Mo., as a part of NASQAN.
- 4. Suspended-sediment data are being collected on a miscellaneous basis at Weeping Water Creek at Weeping Water, Nebr., South Branch Weeping Water Creek near Union, Nebr., and Weeping Water Creek near Union, Nebr., in cooperation with the Nebraska Natural Resources Commission.

Republican Subregion

- 1. Suspended-sediment data are being collected on a near-monthly basis at Beaver Creek at Cedar Bluffs, Kans., South Fork Sappa Creek near Brewster, Prairie Dog Creek above Norton Reservoir, Kans., and White Rock Creek near Burr Oak, Kans., in cooperation with the Kansas Water Resources Board.
- 2. Suspended-sediment data are being collected on a flow rate basis at Frenchman Creek near Palisade, Neb., in cooperation with the U.S. Bureau of Reclamation.

Smoky Hill Subregion

1. Suspended-sediment data are being collected on a near-monthly basis at Smoky Hill River near Enterprise, Kans., Saline River near Tescott, Kans., Solomon River at Niles, Kans., North Fork Smoky Hill River near McAllaster, Kans., Ladder Creek below Chalk Creek near Scott City, Kans., Big Creek near Hays, Kans., North Fork Big Creek near Victoria, Kans., Saline River near Russell, Kans., North Fork Solomon River at Glade, Kans., Deer Creek near Phillipsburg, Kans., South Fork Solomon River above Webster Reservoir, Kans., and Kill Creek near Bloomington, Kans., in cooperation with the Kansas Water Resources Board.

Kansas Subregion

1. Suspended-sediment data are being collected on a near monthly basis at Kansas River at Wamego, Kans., Little Blue River near Barnes, Kans., and Stranger Creek near Tonganoxie, Kans., in cooperation with the Kansas Water Resources Board.

- 2. Suspended-sediment data are being collected on a periodic basis at Kansas River at Lecompton, Kans., and Kansas River at DeSoto, Kans., in cooperation with the U.S. Corps of Engineers.
- 3. Suspended-sediment data are being collected on a periodic basis at Sixmile Creek trib. 5 mi. NE of Auburn, Kans., Sixmile Creek trib. 4 mi. NE of Auburn, Kans., Wakarusa River 5 mi West of Auburn, Kans., and Wakarusa River 4 mi west of Auburn, Kans., in cooperation with the U.S. Soil Conservation Service.
- 4. Suspended-sediment data are being collected on a miscellaneous basis at Big Blue River at Beatrice, Nebr., and at Little Blue River at Hollenberg, Kans., in cooperation with the Nebraska Natural Resources Commission.

Chariton-Grand Subregion

- 1. Suspended-sediment data are being collected on an intermittent basis at Elk Creek near Decatur City, Iowa, as part of the National Hydrologic Benchmark Network.
- 2. Suspended-sediment data are being collected on a monthly basis at Grand River near Summer, Mo., and at Chariton River at Praire Hill, Mo., as a part of NASQAN.

Gasconade-Osage Subregion

- 1. Suspended-sediment data are being collected on a near-monthly basis at Dragoon Creek near Burlingame, Kans., and Pottawatomie Creek near Garnett, Kans., in cooperation with the Kansas Water Resources Board.
- 2. Suspended-sediment data are being collected on a monthly basis at Osage River near Schell City, Mo., Osage River below St. Thomas, Mo., and at Gasconade River at Jerome, Mo., as a part of NASQAN.

Lower Missouri Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Missouri River at Hermann, Mo., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at Lamino River near Blackwater, Mo., as part of NASQAN.

Special Studies

A study by the Kansas district is in progress to find relations between channel bed and bank material, gradient, discharge, and channel geometry for streams throughout the Missouri River basin has been completed and the final report is in review. Through a program in cooperation with the U.S. Bureau of Land Management to help define baseline conditions in the potential coal mining Bull Mountain region of Montana, six monthly suspended-sediment stations were established in October. In addition, sediment sampling was continued at Timber Creek near Van Norman, Mont., and at Nelson Creek near Van Norman, Mont., in cooperation with the U.S. Bureau of Land Management.

As part of the program to establish baseline data in areas of potential development for coal extraction in the Tongue and Powder River drainages of Montana, 15 sites were sampled for suspended sediment. Sampling frequencies ranged from monthly on perennial streams to periodic on intermittent streams.

Sediment data are being collected at several sites in the Little Powder River basin and the adjacent Donkey Creek basin to relate suspended-sediment discharge to water discharge. The purpose is to determine and compare the sediment-yield characteristics of these two basins, one of which has considerable mining activity and contains a rapidly growing municipality while the other is relatively untouched.

Sediment data are being collected at several sites in the Rock Creek-Clear Creek drainage basin to relate suspended-sediment discharge to water discharge. The purpose is to detect changes in the sediment discharge characteristics of the stream as it heads in the mountains, flows through a municipal area, through an agricultural area, and finally through a badlands, semiarid region.

PS-69 pumping sediment samplers are operating at Lower Hay Creek Trib. near Wibaux, Mont., and at Antelope Creek Trib. No. 4 near Zap, N. Dak., as part of EMRIA studies. Sediment data are collected at these and several other sites in the study basins.

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD U.S. Geological Survey Box 25046, Mail Stop 415 Denver Federal Center Lakewood, CO 80225

District Chief, WRD
U.S. Geological Survey
1950 Avenue A-Campus West
University of Kansas
Lawrence, KS 66045

District Chief, WRD U.S. Geological Survey 301 South Park Avenue Federal Building, Room 428 Drawer 10076 Helena, MT 59601 District Chief, WRD U.S. Geological Survey P.O. Box 1230 Federal Building, Room 269 400 South Clinton St. Iowa City, IA 52244

District Chief, WRD U.S. Geological Survey 1400 Independence Road Mail Stop 200 Rolla, MO 65401

District Chief, WRD U.S. Geological Survey Federal Building and U.S. Courthouse Room 406 100 Centennial Mall North Lincoln, NE 68508 District Chief, WRD U.S. Geological Survey 821 East Interstate Avenue Bismarck, ND 58501

District Chief, WRD U.S. Geological Survey P.O. Box 1125 J.C. O'Mahoney Federal Center Room 5017 2120 Capitol Avenue Cheyenne, WY 82001 District Chief, WRD U.S. Geological Survey 200 Fourth Street, SW Federal Building, Room 308 Huron, SD 57350

MISSOURI REGION

SOIL CONSERVATION SERVICE

1. Studies of sediment damages and determinations of sediment yields were made in the following watersheds:

a. Public Law 566

Major Drainage	Watershed	Stream	County(s)	State
Missouri River	Twin Ponies	Pony Crk	Pottawattamie	IA
Kansas River	Wakarusa River	Wakarusa River	Douglas Osage Shawnee Wabaunsee	KS
Missouri River	Wolf River	Wolf River	Brown Doniphan	KS
Missouri River	Roys Crk	Roys Crk	Brown	KS
Missouri River	Pony Crk	Pony Crk	Brown Nemaha	KS
Elkhorn River	Maple Crk	Maple Crk	Stanton Cuming Colfax Dodge	NE
Big Blue River	Wolf-Wildcat	Wolf Crk Wildcat Crk	Gage Pawnee	NE
Platte River	Bone Crk	Bone Crk	Butler	NE
Platte River	Rock Crk	Rock Crk	Saunders Lancaster	NE
Platte River	Stevens-Callahan	Stevens Crk Callahan Crk	Lancaster Cass	NE
North Platte River	Upper North Laramie		Albany	WY
South Platte River	East Bijou Crk*	East Bijou Crk	Adams, Arapahoe and Elbert	CO

^{*} An inventory of gully and streambank erosion as well as sheet erosion, including mapping on 1/24,000 scale, was made on 175,000 acres.

b. Public Law 534

Major Drainage	Watershed	Stream	County(s)	State
Little Sioux River	Westside	Bacon Crk	Ida Woodbury	IA
Little Sioux River	Camp Crk	Direct Tributary	Woodbury	IA

c. Resource Conservation and Development

Major Drainage	Watershed	Stream	County(s)	<u>State</u>
White River	Deadman Crk	Deadman Crk	Sioux	NE

d. River Basin Investigations

<u>Major Basin</u>	Basin Reported	
Missouri River	Missouri Tributaries	NE

e. Conservation Operations Public Law 46

Major Drainage	Watershed	County	<u>State</u>
North Platte	Doby Spring	Albany	WY

2. Reservor Sedimentation Surveys

- a. A reservoir sedimentation survey was made on Mule Creek "R" reservoir, Mills County, Iowa.
- b. A reservoir sedimentation survey was made on Lake Mitchell in Davison County, South Dakota.

3. Special Study

a. National Systematic Sedimentation Surveys

Box Elder Creek Reservoir in Sheridan County, Montana: sediment accumulation survey, watershed land treatment inventory and erosion study in drainage area completed.

East Fork Big Springs Creek Reservoir in Fergus County, Montana: sediment accumulation survey completed.

Baker Lake Reservoir in Fallon County, Montana: land use inventory, land treatment inventory and erosion study in drainage area completed.

MISSOURI BASIN REGION

Water and Power Resources Service

A sediment yield of 4.76 m 3 /km 2 (1.0 acre-feet/mi 2) per year was used for the drainage areas for West Bow and Pearl Reservoirs. The 100-year values of sediment inflow to West Bow Reservoir of 5.0 x 10^6 m 3 (4,100 acre-feet) and to Pearl Reservoir of 6.2 x 10^6 m 3 (5,000 acre-feet) are being used in an appraisal report.

Angostura Reservoir in South Dakota was resurveyed by surveying preestablished range lines. In all, 24 range lines were surveyed, of which 11 were in the mainstream of the Cheyenne River and 13 were in the tributaries. In addition, sediment samples were taken at several locations in the reservoir, the headwaters, and the tributaries. For the resurvey, distances across range lines were fixed using either the "cutting-in" method or by the use of piano wire. Depths were recorded continuously using the E&R Center's Raytheon sonic device.

The sediment study for Coal Creek Dam, Longs Peak Division, showed that a yield estimate of 71.4 $\rm m^3/km^2$ (0.15 acre-feet/mi²) per year and 100-year sediment estimates 0.5 x $10^6\rm m^3$ (390 acre-feet) with a depth of sediment at the dam of 4.6 m (15 ft) should be used in preparing feasibility level designs.

The Niobrara River Environmental Study has been contracted to Environmental Research & Technology, Inc., of Fort Collins, Colorado. This study will include a whooping crane habitat assessment as well as a hydraulics, sedimentation, and channel morphology study to determine minimum flow requirements below the proposed Norden Dam to maintain the sandbar habitat of the whooping crane. Hydraulic and sedimentation data in the Niobrara River Channel downstream from the proposed Norden Damsite were collected in 1979 by the Water and Power Resources Service to be used to monitor the river as well as to aid in the environmental study. Eleven cross sections in the 64.4 km (40 mi) study reach were established during a June data collection trip when the discharge was about 19.8 m^3/s (700 ft³/s). Then in August when the discharge was about 14.2 m^3/s (500 ft³/s) data were collected at the same 11 locations. Data for each cross section for each discharge included a suspended sediment sample, bed material samples, discharge measurement water surface elevations for computing slope, and water samples for chemical and nutrient analysis. Similar data are to be collected during the 1980 runoff period.

A representative from our Sedimentation Section attended a meeting regarding the Platte River study along with representatives from several other agencies including FWS and USGS. The Water and Power Resources Service is responsible for preparing a series of technical appendixes which will include a present condition hydrologic base; a discussion of possible future demands and their water requirements; plans to supply future demands; future options and other related streamflow conditions; and an economic, social, and environmental assessment.

MISSOURI BASIN REGION (cont)

Water and Power Resources Service

A field trip was made to Torrington, Wyoming, and vicinity, to assist in locating sediment sampling sites, taking samples, and discussing the program of sampling during the 1979 silt run for Guernsey Reservoir. Five sampling sites were selected on the North Platte River: North Platte at Orin; North Platte below Glendo Reservoir; North Platte below Whalen; and North Platte at the Wyoming/Nebraska stateline. Four sites were selected on Interstate Canal: miles 2.7, 50.8, 73.7, and 94.6; and four sites were selected on Fort Laramie Canal: miles 0.7, 30.1, 83.5, and 110.0. Samples will be taken at least once a week during the irrigation season and once a day during the week of the silt run.

ARKANSAS-WHITE-RED REGION

CORPS OF ENGINEERS

Southwestern Division

Albuquerque District

Sediment Load Measurements. Suspended sediment measurements were made at two stations in this region. The collection of suspended sediment samples on the Arkansas River at Las Animas and the Purgatoire River near Las Animas was temporarily discontinued during CY 1979.

<u>Sedimentation Surveys</u>. Although a resurvey of John Martin Reservoir, Arkansas River, Colorado had been scheduled for CY 1979; this work was not accomplished. This survey has been rescheduled for CY 1980.

Little Rock District

Sediment load measurements continued at 44 stations during the year on Arknasas River, Mulberry, Spadra Creek, Little Piney Creek, Piney Creek, Petit Jean, Dutch Creek, Fourche La Fave, White River, Taylor Bay, James River, Buffalo River, Bryant Creek, North Fork, Current River, Black River, Eleven Point River, Strawberry River and Little Red River.

Tulsa District

Sedimentation Surveys. A resurvey of John Redmond Lake was conducted and a resurvey of Great Salt Plains Lake, initiated in 1978, was completed. A contract was initiated for installation of pole monuments on 12 sedimentation ranges on John Redmond Dam and Reservoir for use in making hydrographic resurveys during flood stages. A computer program was developed for editing hydrographic survey data from cassette tapes generated on board the survey boat. This program displays original and resurveyed range profiles simultaneously on a CRT and enables error corrections, after which a hard copy plot tape or punched cards of the corrected profiles can be obtained automatically.

Sediment Load Measurements. The suspended sediment sampling program was reduced as a cost reduction measure. A total of 65 stations, 40 in the Arkansas River Basin and 15 in the Red River Basin are presently in operation.

Other Investigations. Design Memorandum No. 22, Sedimentation and Degradation Ranges, Candy Lake, was prepared. Segmental elevation-area data for Birch, Hugo, Kaw, L&D 15, L&D 16, Oologah, Optima, and Waurika Lakes were developed. All historical sediment sampling data for the Tulsa District was compiled and sent to USGS, Oklahoma District for entry in the WATSTORE data system which will enable computer retrieval and statistical manipulation for future studies using the data of several agencies. A mathematical model for sediment inflow and distribution for Canton Lake, in conjunction with the Waterways Experiment Station, was initiated.

ARKANSAS-WHITE-RED REGION

GEOLOGICAL SURVEY

Upper White Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at North Sylamore Creek near Fifty Six, Ark., as part of the National Hydrologic Benchmark Network.
- 2. Suspended-sediment data are being collected on a monthly basis at White River at Newport, Ark., as a part of the National Stream Quality Accounting Network (NASQAN).

Upper Arkansas Subregion

- 1. Suspended-sediment data are being collected on a twice monthly basis at Arkansas River at Canon City, Colo., at Arkansas River at Portland, Colo., and at Arkansas River near Portland, Colo., in cooperation with the U.S. Bureau of Reclamation, Lower Missouri River Basin Region.
- 2. Suspended-sediment data are being collected on a monthly basis at Halfmoon Creek near Malta, Colo., as a part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected on a daily basis at Purgatoire River below Trinidad Dam, Colo., in cooperation with the U.S. Corps of Engineers, Albuquerque District.
- 4. Suspended-sediment data were collected on a daily basis in cooperation with the U.S. Bureau of Land Management:

Apishapa River at Aquilar, Colo.
MFK Purgatoire River at Stonewall, Colo.
Mulino Canyon near Weston, Colo.
Sarcillo Canyon near Segundo, Colo.
Purgatoire River at Madrid, Colo.
Mulligan Canyon near Boncarbo, Colo.
Reilly Canyon at Cokedale, Colo.
Carpios Canyon near Jansen, Colo.

Middle Arkansas Subregion

1. Suspended-sediment data are being collected on a near monthly basis at the following sites in cooperation with the Kansas Water Resources Board:

Arkansas River at Syracuse, Kans. Whitewoman Creek near Leoti, Kans. Mulberry Creek near Dodge City, Kans. Arkansas River near Kinsley, Kans. Guzzler's Gulch near Ness City, Kans.

Pawnee River near Larned, Kans. Walnut Creek at Albert, Kans. Rattlesnake Creek near Macksville, Kans. Cow Creek near Claflin, Kans. Blood Creek near Boyd, Kans. Arkansas River near Hutchinson, Kans. Little Arkansas River at Alta Mills, Kans. Little Arkansas River at Valley Center, Kans. North Fork Ninnescah River above Cheney Reservoir, Kans. South Fork Ninnescah River near Pratt, Kans. Ninnescah River near Peck, Kans. Slate Creek at Wellington, Kans. Cole Creek near De Graff, Kans. Whitewater River at Towanda, Kans. Arkansas River at Arkansas City, Kans. Walnut River at Winfield, Kans.

Upper Cimarron Subregion

1. Suspended-sediment data are being collected on a near monthly basis at Bear Creek near Johnson, Kans., at Cavalry Creek at Coldwater, Kans., at North Fork Cimarron River near Richfield, Kans., and Crooked Creek near Nye, kans., in cooperation with the Kansas Water Resources Board.

Lower Cimarron Subregion

1. Suspended-sediment data are being collected from Cimarron River near Buffalo, Okla., and Cimarron River at Perkins, Okla., as a part of NASQAN.

Arkansas-Keystone Subregion

- 1. Suspended-sediment data are being collected on a near monthly basis at Medicine Lodge River near Kiowa, Kans., in cooperation with the Kansas Water Resources Board.
- 2. Suspended-sediment data are being collected on a monthly basis at Arkansas River at Ralston, Okla., as a part of NASQAN.

Neosho-Verdigris Subregion

1. Suspended-sediment data are being collected at Newt Graham Lock and Dam (Verdigris River) near Inola, Okla., and at Neosho River below Fort Gibson Lake near Fort Gibson, Okla., as a part of NASQAN.

Upper Canadian Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Canadian River near Sanchez, N. mex., in conjunction with the Water Quality Surreillance Program and in cooperation with the NMISC (New Mexico Interstate Stream Commission).
- 2. Suspended-sediment data are being collected on a monthly basis at Revuelto Creek near Logan, N. Mex., in cooperation with NMISC.
- 3. Suspended-sediment data are being collected on a monthly basis at Canadian River above New Mexico-Texas State line as a part of NASQAN.
- 4. Suspended-sediment data are being collected on a quarterly basis at Vermejo . River near Dawson, N. Mex., in cooperation with NMISC.

Lower Canadian Subregion

- 1. Suspended-sediment data are being collected at Canadian River at Calvin, Okla., at Canadian River near Whitefield, Okla., and at Canadian River near Canadian, Tex., as part of NASQAN.
- 2. Suspended-sediment data are being collected at Blue Creek tributary near Blocker, Okla., at Blue Creek near Blocker, Okla., and at Mathuldy Creek near Crowder, Okla., for use in the BLM EMRIA project.
- 3. Suspended-sediment data are being collected at Brushy Creek near Hailey-ville, Okla., at Peaceable Creek near Haileyville, Okla., and at Deer Creek near McAlester, Okla., for use in the coal Monitoring project.

North Canadian Subregion

- 1. Suspended-sediment data are being collected at North Canadian River near Wetumka, Okla., at Deep Fork near Beggs, Okla., at Beaver River near Glymon, Okla., at Beaver River at Beaver, Okla., and at North Canadian River at Woodward, Okla., as a part of NASOAN.
- 2. Suspended-sediment data are being collected at North Canadian River near Seiling, Okla., in cooperation with the U.S. Corps of Engineers.

Lower Arkansas Subregion

1. Suspended-sediment data are being collected on a monthly basis at Arkansas River at near Tulsa, Okla., at Arkansas River at Dam 13 near Van Buren, Ark., and at Arkansas River at David D. Terry Lock and Dam below Little Rock, Ark., as a part of NASQAN.

2. Suspended-sediment data are being collected at the following sites for use in the BLM - EMRIA project:

James Fork near Hackett, Ark.
James Fork near Williams, Okla.
Coal Creek tributary near Bokoshe, Okla.
Coal Creek near Panama, Okla.

3. Suspended-sediment data are being collected at the following sites for use in the Coal Monitoring project:

Coal Creek near Spiro, Okla.
Fourche Maline near Wilburton, Okla.
Red Oak Creek near Red Oak, Okla.
Caston Creek at Wister, Okla.
Morris Creek at Howe, Okla.
Sugarload Creek near Monroe, Okla.
Owl Creek near McCurtain, Okla.
Holi-tuska Creek near Panama, Okla.

Red Headwaters Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at North Fork Red River near Headrick, Okla., at Salt Fork Red River near Elmer, Okla., at Prairie Dog Town Red River near Wayside, Tex., and at and at Prairie Dog Town Fork Red River near Childress, Tex., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a periodic basis at the following sites in cooperation with the U.S. Corps of Engineers:

Little Red River near Turkey, Tex. (started daily operation Feb. 1, 1979)
Jonah Creek at Weir, near Estelline, Tex.
Salt Creek at County Road Bridge, near Estelline, Tex. (discontinued Sept. 30, 1979)
Salt Creek near Estelline, Tex. (discontinued Sept. 30, 1979)
East Salt Creek at County Road Bridge, near Estelline, Tex. (discontinued Sept. 30, 1979)
*

3. The collection of suspended-sediment data on a daily or more frequent basis began Feb. 1, 1979, at Little Red River near Turkey, and Prairie Dog Town Red River near Lakeview, Tex., in cooperation with The University of Texas at Austin.

Red-Washita Subregion

1. Suspended-sediment data are being collected at Blue Beaver Creek near Cache, Okla., as a part of the National Hydrologic Benchmark Network.

- 2. Suspended-sediment data are being collected on a monthly basis at Red River near Burkburnett, Tex., at Red River at Denison Dam near Denison, Tex., at Red River near Gainesville, Tex., and at Washita River near Durwood, Okla. as a part of NASQAN.
- 3. Suspended-sediment data are being collected on a periodic basis at the following sites in cooperation with the U.S. Corps of Engineers:

Wichita River near Seymour, Tex. (discontinued Sept. 30, 1979) Red River near Quanah, Tex.

North Pease River near Childress, Tex. (discontinued Sept. 30, 1979)

Middle Pease River near Paducah, Tex. (discontinued Sept. 30, 1979)

Middle Pease River below Paducah, Tex. (started Oct. 1, 1979)

Pease River near Childress, Tex.

North Wichita River near Paducah, Tex. (discontinued Sept. 30, 1979)

North Wichita River near Truscott, Tex.

South Wichita River at Ross Ranch, near Benjamin, Tex. (discontinued Sept. 30, 1979)

South Fork Wichita River near Benjamin, Tex. (discontinued Sept. 30, 1979)

Red-Sulphur Subregion

- 1. Suspended-sediment data are being collected from Kiamichi River near Big Cedar, Okla., as a part of the National Hydrologic Benchmark Network.
- 2. Suspended-sediment data are being collected at Coal Creek near Lehigh, Okla., for use in the BLM EMRIA project.
- 3. Suspended-sediment data are being collected at Muddy Boggy Creek at Atoka, Okla., for use in the Coal Monitoring project.
- 4. Suspended-sediment data are being collected on a monthly basis at Little River at Millwood Dam, near Ashdown, Ark., Red River at Fulton, Ark., and at Sulphur River south of Texarkana, Ark., as a part of NASQAN.
- 5. Suspended-sediment data are being collected on a monthly basis at Twelvemile Bayou near Dixie, La., as a part of NASQAN.

Laboratory Activities

1. The Geological Survey sediment laboratory located in Baton Rouge, La., analyzed suspended-sediment and bed-material samples collected by the U.S. Corps of Engineers at the following locations.

Red River at Fulton, Ark. Red River at Shreveport, La. Red River at Colfax, La. For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD
U.S. Geological Survey
Federal Office Building
Room 2301
700 West Capitol Avenue
Little Rock, AR 72201

District Chief, WRD U.S. Geological Survey P.O. Box 66492 6554 Florida Boulevard Baton Rouge, LA 70896

District Chief, WRD U.S. Geological Survey 201 Northwest Third Street Room 621 Oklahoma City, OK 73102

District Chief, WRD U.S. Geological Survey Bldg. 53, Denver Federal Center Mail Stop 415, Box 25046 Lakewood, CO 80225 District Chief, WRD U.S. Geological Survey 1950 Avenue A - Campus West University of Kansas Lawrence, KS 66045

District Chief, WRD U.S. Geological Survey P.O. Box 26659 815 Western Bank Building 505 Marquette, NW Albuquerque, NM 87125

District Chief, WRD U.S. Geological Survey Federal Building, Room 649 300 East Eighth Street Austin, TX 78701

ARKANSAS-WHITE-RED REGION

SOIL CONSERVATION SERVICE

a. Public Law 566

Major Drainage	Watershed	Stream	County(s)	<u>State</u>
Neosho River	Diamond Crk	Diamond Crk	Morris Chase	KS
Neosho River	South Fork Cottonwood River	Cottonwood River	Butler Greenwood Chase	KS
Neosho River	Middle Crk	Middle Crk	Morris Chase Marion	KS
Neosho River	Peyton Crk	Peyton Crk	Chase	KS
White River	Fourche Crk	Fourche Crk	Randolph	AR
Red River	Beaver Crk	Big Beaver	Comanche Stephens	OK
Deep Fork- Canadian River	Dry Crk	Dry Beaver Shiny N. Branch Chuckaho Dosie	Lincoln	OK
Continued studies on	:			
Cimarron River	Turkey Crk	Turkey Elm Sand Dry Hell Gone Buffalo Dry Salt	Garfield Major Kingfisher Alfalfa	OK
S. Canadian River	Coal Crk	Coal Crk Wildhorse Caney Buckhorn Sandy Deer	Pittsburg Hughes	OK

ζ.

b. River Basin Investigation

Major Basin	Basin Reported	State	
Lower Mississippi	Arkansas Statewide	AR	

2. Sedimentation Surveys

Sedimentation surveys were made on two reservoirs in Colfax County, New Mexico using the range method. New Urraca Creek Reservoir is on the North Fork, Urraca Creek on Philmont Scout Ranch and is part of the drinking water supply for the Ranch. The second reservoir is an off-stream irrigation storage reservoir. Water is diverted from Ute Creek into the reservoir. Sediment accumulation in the New Urraca Creek Reservoir averaged 0.3 acre-feet/square mile/year from a drainage area of 10.2 square miles during a period of 21.5 years. The off-stream irrigation storage reservoir during the last 65 years has had an average sediment accumulation rate of 2.88 acre-feet/square mile/year.

Sedimentation surveys were also completed on the following reservoirs during the evaluation period:

Reservoir	Major Drainage	County	State
Site 2, Logan Slough Crk	Red River	Lamar	TX
Lake McClellan Sandstone #16 Cave Crk #1	Red River	Gray Beckham Okmulgee	TX OK OK

3. Non-point Pollution Studies

County sediment control plans were completed for the New Mexico counties in the region during 1979. The State of New Mexico sedimentation study was completed in March 1979. The New Mexico Water Quality Control Commission accepted the Overall Water Quality Management Plan in May 1979. These plans and studies were done under PL 92-500, Section 208, Non-point Source Pollution. A detailed work plan for continued 208 studies was submitted to the Environmental Protection Agency, September 1979, and accepted in December 1979.

ARKANSAS-WHITE-RED REGION

Water and Power Resources Service

The 100-year estimated sediment volume of 27.1 x $10^6 \mathrm{m}^3$ (22,000 acre-feat) for Cookietown Reservoir was approved which was less then the previously recommended value of 38.2 x $10^6 \mathrm{m}^3$ (31,000 acre-feet).

The Draft Environmental Impact Statement for the Chikaskia Project in Kansas was reviewed and several additions and changes concerning sedimentation were recommended. A sediment yield rate of 367 $\rm m^3/km^2$ (0.77 acre-feet/mi²) per year was used for Corbin Reservoir.

TEXAS-GULF REGION

GEOLOGICAL SURVEY

Sabine Subregion

- 1. Suspended-sediment data are being collected at Sabine River near Ruliff, Tex., as a part of the National Stream Quality Accounting Network (NASQAN).
- 2. Suspended-sediment data are being collected on periodic basis at Cow Bayou near Mauriceville, Tex., as a part of the Federal CBR program (discontinued September 30, 1979).

Neches Subregion

1. Suspended-sediment data are being collected on a monthly basis at Neches River at Evadale, Tex. as a part of NASQAN.

Trinity Subregion

- 1. Suspended-sediment data are being collected on a periodic basis at West Fork Trinity River near Jacksboro, Tex. (discontinued September 30, 1979), at Mountain Creek near Cedar Hill, Tex., Duck Creek near Garland, Tex., and at Kings Creek near Kaufman, Tex., as a part of the Federal CBR program.
- 2. Suspended-sediment data are being collected on a monthly basis at Trinity River at Trinidad, Tex., as a part of NASQAN.
- 3. Suspended-sediment data are being collected on a periodic basis at Cypress Creek near Westfield, Tex., and Greens Bayou near Houston, Tex., as part of the Federal CBR program (both stations discontinued September 30, 1979).
- 4. Suspended-sediment data are being collected on a daily or more frequent basis at Trinity River near Oakwood, Tex., in cooperation with the U.S. Corps of Engineers.
- 5. Suspended-sediment data are being collected on a monthly basis at Trinity River at Romayor, Tex., and at Chocolate Bayou near Alvin, Tex., as a part of NASQAN.

Galveston Bay - San Jacinto Subregion

1. Suspended-sediment data are being collected on a periodic basis at West Fork San Jacinto River near Conroe, Tex., as part of NASQAN. The collection of suspended-sediment data on a periodic basis at Buffalo Bayou at West Belt Dr., Houston, Tex., began May 1, 1979, as part of NASQAN.

Middle Brazos Subregion

- 1. Suspended-sediment data are being collected at Miller Creek near Munday, Tex. (discontinued September 30, 1979), at Double Mountain Fork Brazos Fiver at Justiceburg, Tex., and at Stinking Creek near Aspermont, Tex., as a part of the Federal CBR program.
- 2. Suspended-sediment data are being collected on a monthly basis at Salt Fork Brazos River near Aspermont, Tex., Double Mountain Fork Brazos River near Aspermont, Tex., Brazos River near Highbank, Tex., and at Brazos River near South Bend, Tex., as a part of NASQAN.

Lower Brazos Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Brazos River at Richmond, Tex., as part of the Federal CBR program.
- 2. Suspended-sediment data are being collected on a monthly basis at South Fork Rocky Creek near Briggs, Tex., as a part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected on a periodic basis at Berry Creek near Georgetown, Tex., as a part of the Federal CBR program.
- 4. Suspended-sediment data are being collected on a weekly or more frequent basis at Navasota River near Bryan, Tex., in cooperation with the U.S. Corps of Engineers.
- 5. Suspended-sediment data are being collected on a monthly basis at Brazos River near Rosharon, Tex., and at Little River near Cameron, Tex., as a part of NASQAN.

Upper Colorado Subregion

1. Suspended-sediment data were being collected on a monthly basis at Colorado River above Silver, Tex., as a part of NASQAN.

Lower Colorado-San Bernard Coastal Subregion

- 1. Suspended-sediment data are being collected on a periodic basis at Walnut Creek at Webberville Road, Austin, Tex., and at Onion Creek at US Hwy 183, Austin, Tex., as a part of the Federal CBR program.
- 2. Suspended-sediment data are being collected on a monthly basis at Colorado River at Austin, Tex., Colorado River at Wharton, Tex., Colorado River near San Saba, Tex., and at San Bernard River near Boling, Tex., as a part of NASQAN. The collection of suspended-sediment data at Llano River at Llano, Tex., began April 1, 1979, as part of NASQAN.

3. Suspended-sediment data are being collected on a daiy basis at Concho River at Paint Rock, Tex. and at Colorado River at Ballinger, Tex., in cooperation with Texas Department of Water Resources.

Central Texas Coastal Subregion

1. Suspended-sediment data are being collected on a monthly basis at Guadalupe River at Victoria, Tex., San Antonio River at Goliad, Tex., Lavaca River near Edna, Tex., and at Mission River at Refugio, Tex., as a part of NASQAN.

Nueces-Southwestern Texas Coastal Subregion

- 1. Suspended-sediment data are being collected on a periodic basis at Frio River at Calliham, Tex. (discontinued September 30, 1979), Atascosa River at Whitsett, Tex., and at San Miguel Creek near Tilden, Tex., as a part of the Federal CBR program.
- 2. Suspended-sediment data are being collected on a monthly basis at Nueces River near Three Rivers, Tex., and at Los Olmos Creek near Falfurrias, Tex., as a part of NASQAN.

For additional information about Geological Survey activities within this region, contact the following office:

District Chief, WRD U.S. Geological Survey Federal Building, Room 649 300 East Eighth Street Austin, TX 78701

TEXAS-GULF REGION

SOIL CONSERVATION SERVICE

1. Reservoir sedimentation surveys were made in the following reservoirs in 1979:

Reservoir	Major Drainage	County	State	
Site 17, Denton Crk	Trinity River	Wise	TX	
Site 11B, Elm Fork	Trinity River	Cooke	TX	
Site 21, Clear Crk	Trinity River	Cooke	TX	
Site 11. Escondido Crk	Sand Antonio River	Karnes	TX	

2. Non-point Pollution Studies

County sediment control plans were completed for the New Mexico counties in the region during 1979. The New Mexico state sedimentation study was completed in March 1979. The New Mexico Water Quality Control Commission accepted the Overall Water Quality Management Plan in May 1979. These plans and studies were done under PL-500, Section 208, Non-point Source Pollution. A detailed work plan for continued 208 studies was submitted to the Environmental Protection Agency and accepted December 1979. These plans and studies cover the New Mexico portion of the region.

Water and Power Resources Service

A planning meeting for the sedimentation resurvey of Lake Meredith on the Canadian River near Amarillo, Texas, was held. The field work is scheduled to begin in October 1979, and the hydrographic survey in February 1980. The resurvey funded by the University of Texas will be a cooperative effort of the Southwest Region, the Canadian River Project, and the E&R Center.

RIO GRANDE REGION

CORPS OF ENGINEERS

Southwestern Division

Albuquerque District

Sedimentation Surveys

- 1. The installation of 24 sedimentation ranges and 9 degradation ranges was completed at Los Esteros Lake on the Pecos River, New Mexico. All of these ranges were surveyed with aerial techniques in June 1979.
- 2. The first detailed report on sedimentation at Cochiti Lake which described the result of the resurvey of April 1978 was published in July 1979.
- 3. Computations were completed for determining changes in storage capacity and sediment deposition at Abiquiu Lake based on data collected in May 1978. New area-capacity tables were issued to interested parties for use beginning 1 January 1980. Form 1787 (Sedimentation Data Summary) and a survey summary letter report will be completed early in 1980.

<u>Sediment Load Measurements</u>. Suspended sediment measurements were made at four stations in the Rio Grande Region.

Other Investigations

- 1. In February 1979, Water and Environmental Consultants, Inc. of Fort Collins, Colorado prepared a report for the Albuquerque District entitled "Plan of Study For Determining Hydraulics and Sediment Transport Characteristics of the Rio Grande in New Mexico above Elephant Butte Dam". The recommendations in this report will be used as guidelines for proceeding with sediment investigations in the Rio Grande Basin.
- 2. In November 1979, a contract was awarded to Simons and Li Engineering of Fort Collins, Colorado to develop a computer program that will be used to predict long term effects of existing and proposed flood and sediment control projects on the characteristics of the Rio Grande from Cochiti Dam to Elephant Butte Reservoir. This work is scheduled to be completed in the summer of 1980.
- 3. Abiquiu, Cochiti, Galisteo and Jemez Canyon Dams continued to be operated to control sediment flow in the Rio Grande. In this regard, a 2,500 acre foot permanent pool has been established at the Jemez Canyon project.

RIO GRANDE REGION

GEOLOGICAL SURVEY

Rio Grande Headwaters Subregion

1. Suspended-sediment data are being collected on a monthly basis at Rio Grande near Lobatos, Colo., as a part of the National Stream Quality Accounting Network (NASQAN).

Rio Grande - Elephant Butte Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Red River at Fish Hatchery near Questa, N. Mex., in cooperation with the New Mexico Interstate Streams Commission (NMISC).
- 2. Suspended-sediment data are being collected on a monthly basis at Rio Chama above Abiquiu Reservoir, N. Mex., Rio Chama below Abiquiu Dam, N. Mex., and at Rio Chama near Chamita, N. Mex., in cooperation with the U.S. Corps of Engineers.
- 3. Suspended-sediment data are being collected on a daily basis at Rio Grande at Otowi Bridge near San Ildefonso, N. Mex., and at Rio Grande near Albuquerque, N. Mex., as a part of the Federal CBR program.
- 4. Suspended-sediment data are being collected on a daily basis at Rio Grande below Cochiti Dam, N. Mex., in cooperation with the U.S. Corps of Engineers.
- 5. Suspended-sediment data are being collected on a daily basis at Arroyo Chico near Guadalupe, N. Mex., in cooperation with the U.S. Bureau of Land Management.
- 6. Suspended-sediment data are being collected on a daily basis at Rio Puerco near Bernardo, N. Mex., as a part of the Federal CBR program.
- 7. Suspended-sediment data are being collected on a monthly basis at Rio Grande at San Felipe, N. Mex., and at Rio Grande at Isleta, N. Mex., in conjunction with the Water Quality Surveillance Program and financed cooperatively by NMISC.
- 8. Suspended-sediment data are being collected on a daily basis at Rio Grande near Bernardo, N. Mex., at Rio Grande at San Acacia, N. Mex., and at Rio Grande at San Marcial, N. Mex., in cooperation with NMISC.
- 9. Suspended-sediment data for total-load determinations are being collected on a biweekly basis at Rio Grande at Albuquerque, N. Mex., at Rio Grande near Bernardo, N. Mex., at Rio Grande at San Acacia, N. Mex., and Rio Grande at San Marcial, N. Mex., in cooperation with NMISC.
- 10. Suspended-sediment data are being collected on a daily basis at Rio Grande Conveyance Channel at San Acacia, N. Mex., and at Rio Grande Conveyance Channel at San Marcial, N. Mex., in cooperation with NMISC. This includes bi-reekly determination of total-sediment loads at Rio Grande Conveyance Channel at San Marcial, N. Mex.

- 11. Suspended-sediment data are being collected on an intermittent basis at Rio Salado near San Acacia, N. Mex., in cooperation with NMISC.
- 12. Suspended-sediment data are being collected on a monthly basis at Rio Grande below Elephant Butte Dam, N. Mex., as a part of NASQAN.
- 13. Suspended-sediment data are being collected on a monthly and storm-event basis at Rio Mora near Terrero, N. Mex., as a part of the National Hydrologic Benchmark Network.
- 14. Suspended-sediment data are being collected on a monthly and intermittent basis at Pecos River below Sumner Dam, N. Mex. (formerly called Alamagordo Dam), in cooperation with NMISC, and as a part of NASQAN.
- 15. Suspended-sediment data are being collected on a daily basis at Pecos River at Santa Rosa, N. Mex., and at Pecos River near Artesia, N. Mex., as part of the Federal CBR program.
- 16. Suspended-sediment data were collected on a monthly basis at Pecos River near Puerto de Luna, N. Mex., in conjunction with the Water Quality Surveillance Program and in cooperation with NMISC.
- 17. Suspended-sediment data are being collected on a monthly basis at Pecos River at Red Bluff, N. Mex., at Rio Grande at el Paso, Tex., and at Rio Grande at Fort Quitmon, Tex., as a part of NASQAN.
- 18. Suspended-sediment data are being collected on an intermittent basis at Rito de los Frijoles in Bandelier National Monument, N. Mex., in cooperation with the National Park Service.

Rio Grande - Amistad Subregion

1. Suspended-sediment data are being collected on a monthly basis at Rio Grande at Foster Ranch, near Langtry, Tex., and at Devils River at Pafford Crossing, near Comstock, Tex., as a part of NASQAN.

Rio Grande Closed Basins Subregion

1. Suspended-sediment data are being collected on a monthly basis at Rio Tularosa near Bent, N. Mex., and at Mimbres River near Mimbres, N. Mex., as a part of NASQAN.

Lower Pecos Subregion

1. Suspended-sediment data are being collected on a monthly basis at Pecos River near Langtry, Tex., as a part of NASQAN.

Rio Grande - Falcon Subregion

1. Suspended-sediment data are being collected on a monthly basis at Rio Grande at Laredo, Tex., as a part of NASQAN.

Lower Rio Grande Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Rio Grande River near Brownsville, Tex., as part of the Federal CBR program.
- 2. Suspended-sediment data are being collected on a weekly or more frequent basis at North Floodway near Sebastian, Tex., and at Arroyo Colorado Floodway at El Fuste Siphon, south of Mercedes, Tex., as part of the Federal CBR program.

Special Studies

A water quality monitoring plan for the Rio Grande and Red River in Tacs County, N. Mex., was initiated in October 1978 by the U.S. Bureau of Land Management. The study objectives are to monitor long-term changes in water quality (chemical and sediment) at 14 selected sampling sites. BLM personnel collect monthly samples and the Geological Survey analyzes the samples and publishes the data.

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD U.S. Geological Survey Box 25046, Mail Stop 415 Denver Federal Center Lakewood, CO 80225 District Chief, WRD U.S. Geological Survey P.O. Box 26659 815 Western Bank Building 505 Marquette, NW Albuquerque, NM 87125

District Chief, WRD U.S. Geological Survey Federal Building Room 649 300 East Eighth Street Austin, TX 78701

RIO GRANDE REGION

SOIL CONSERVATION SERVICE

Non-point Pollution Studies

County sediment control plans were completed for the New Mexico counties in the region during 1979. The New Mexico state sedimentation study was completed in March 1979. The New Mexico Water Quality Control Commission accepted the Overall Water Quality Management Plan in May 1979. These plans and studies were done under PL 92-500, Section 208, Nonpoint Source Pollution. A detailed work plan for continued 208 studies was submitted to the Environmental Protection Agency and accepted December 1979.

Water and Power Resources Service

A planning meeting was held in the project office for the sedimentation resurvey of Elephant Butte Reservoir. The field work began after October 1, 1979, and the hydrographic survey in January 1980. This was to be a full resurvey and included cutting out and profiling all sediment range lines in the reservoir. The land surveys were conducted by a survey crew out of the Carlsbad Project Office with some help from Rio Grande Project personnel. Equipment and some personnel for the hydrographic survey were provided from the E&R Center.

A representative of the Sedimentation Section attended the conference on Arroyo Stabilization in Erosive Soil in Albuquerque, New Mexico, on Novemeber 8, 1979, and presented a lecture on "Channel Erosion and Control Techniques." This was a slide presentation on Water and Power Resources Service practices to stabilize river channels for controlling erosion throughout the 17 Western States.

UPPER COLORADO REGION

GEOLOGICAL SURVEY

Colorado Headwaters Subregion

- 1. Suspended-sediment data were collected on a daily basis by automatic pumping samplers at West Tenmile Creek at Wheeler Junction, Colo., at Black Gore Creek near Vail, Colo., and Gore Creek at Vail, Colo., in cooperation with the Colorado Department of Highways (discontinued September 30, 1979).
- 2. Suspended-sediment data are being collected on a monthly basis at Parachute Creek near Grand Valley, Colo., in cooperation with the Environmental Protection Agency.
- 3. Suspended-sediment data are being collected on a daily basis at Parachute Creek at Grand Valley, Colo., and at Roan Creek near Debeque, Colo., as a part of Federal sedimentation study in oil shale areas.
- 4. Suspended-sediment data are being collected on a daily basis at East Middle Fork Parachute Creek near Rio Blanco, Colo., and East Fort Parachute Creek near Rulison, Colo., and on a monthly basis at North Water Creek near Anvil Point, Colo., in cooperation with the U.S. Navy.
- 5. Suspended-sediment data are being collected on a monthly basis at Colorado River near Colorado-Utah State line as a part of the National Stream Quality Accounting Network (NASQAN).

Gunnison Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Gunnison River near Grand Junction, Colo., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at the following sites as a part of the USGS Coal Hydrology program:

Anthracite Creek near Somerset, Colo. Spring Creek near Beaver Hill, Colo. Spring Creek near Montrose, Colo.

Upper Colorado-Dolores Subregion

- 1. Suspended-sediment data are being collected on a comprehensive level at Colorado River near Cisco, Utah.
- 2. Suspended-sediment data are being collected on a monthly basis at Beaver Creek near Norwood, Colo. and San Miguel River at Naturita, Colo., as a part of the USGS Coal Hydrology program.

Great Divide-Upper Green Subregion

1. Suspended-sediment data are being collected on a monthly and storm-event basis at the following sites as a part of the U.S. Geological Survey Federal Energy program:

Little Sandy Creek above Eden, Wyo. Salt Wells Creek near South Baxter, Wyo. Blacks Fork near Lyman, Wyo.

- 2. Suspended-sediment data are being collected on a daily basis at Green River near Green River, Wyo. as a part of the U.S. Geological Survey Federal Energy program.
- 3. Suspended-sediment data are being collected at the following sites on a monthly and storm-event basis in cooperation with the Wyoming State Engineer:

Green River near LaBarge, Wyo.
Big Sandy River near Farson, Wyo.
Big Sandy River below Eden, Wyo.
Hams Fork near Granger, Wyo.
Blacks Fork near Little America, Wyo.

4. Suspended-sediment data are being collected at the following sites on a monthly and storm-event basis in cooperation with the U.S. Bureau of Land Management:

Bitter Creek near Bitter Creek, Wyo.
Bitter Creek above Salt Wells Creek, near Salt Wells, Wyo.
Dry Canyon near South Baxter, Wyo.
Salt Wells Creek near Salt Wells, Wyo.
Little Muddy Creek near Glencoe, Wyo.
Muddy Creek near Hampton, Wyo.
Vermillion Creek near Hiawatha, Colo.

- 5. Suspended-sediment data are being collected on a daily basis at Separation Creek near Riner, Wyo. in cooperation with the U.S. Bureau of Land Management.
- 6. Suspended-sediment data are being collected on a monthly basis at Vermillion Creek at Ink Springs Ranch, Colo., as a part of the USGS Coal Hydrology program.

White-Yampa Subregion

- 1. Suspended-sediment data are being collected on a monthly and storm-event basis at Little Snake River near Dixon, Wyo. in cooperation with the Wyoming State Engineer.
- 2. Suspended-sediment data were obtained on a monthly basis at Yampa River near Maybell, Colo., and at Little Snake River near Lily, Colo., as a part of NASQAN.

- 3. Suspended-sediment data are being collected on a daily basis at Yampa River near Maybell, Colo., and on a weekly basis at Little Snake River near Lily, Colo., in cooperation with the Colorado River Water Conservation District.
- 4. Suspended-sediment data are being collected at several sites in the coal mining region of the Yampa River basin. Two stations are equipped with pumping samplers and where the flow is continuous, daily samples are collected. The following stations are operated at the indicated frequencies:

Middle Creek above Foidel Creek, Colo. Monthly Monthly Foidel Creek at Fish Creek Canyon Road, Colo. Foidel Creek at mouth near Oak Creek, Colo. Daily Jubb Creek near mouth, Colo. Monthly Taylor Creek at mouth near Axial, Colo. Monthly Weekly Good Springs Creek near Axial, Colo. Wilson Creek below Taylor Creek near Axial, Colo. Daily Daily Stokes Gulch near Hayden, Colo.

These stations are operated in cooperation with the U.S. Bureau of Land Management.

5. Suspended-sediment data are being collected at several stations in the Piceance Creek basin to monitor the potential impact of the oil shale development project. All stations are equipped with pumping sediment samplers and where the flow is continuous, daily samples are collected. Intermittent stations are designed to sample all significant peaks and low flow samples are collected when possible. The following stations are operated at the indicated frequency:

Piceance Creek below Rio Blanco, Colo.	Daily
Stewart Gulch above West Fork, Colo.	Daily
W. F. Stewart Gulch at mouth, Colo.	Peaks
Sorghum Gulch at mouth near Rio Blanco, Colo.	Peak s
Cottonwood Gulch near Rio Blanco, Colo.	Peaks
Piceance Creek tributary near Rio Blanco, Colo.	Peak s
Scandard Gulch at mouth, Colo.	Peaks
Willow Creek near Rio Blanco, Colo.	Daily
Piceance Creek above Hunter Creek, Colo.	Daily
Black Sulfur Creek near Rio Blanco, Colo.	Daily
Piceance Creek below Ryan Gulch, Colo.	Daily
Piceance Creek at White River, Colo.	Daily
Stake Springs Draw near Rangely, Colo.	Peaks
Corral Gulch below Water Gulch, Colo.	Peaks
Dry Fk. near Rangely, Colo.	Peaks
Box Elder Gulch near Rangely, Colo.	Peak s
Tributary to Box Elder Gulch near Rangely, Colo.	Peaks
Corral Gulch near Rangely, Colo.	Daily
Yellow Creek near White River, Colo.	Daily

These stations are operated in cooperation with the Colorado River Water Conservation District.

- 6. Suspended-sediment data are being collected on a monthly basis at White River below Meeker, Colo., and White River above Rangely, Colo., in cooperation with the Environmental Protection Agency, and on a weekly basis from May 1 to September 30 at White River above Rangely, Colo., in cooperation with the Colorado River Water Conservation District.
- 7. Suspended-sediment data are being collected on a monthly basis at North Fork White River at Buford, Colo., and South Fork White River at Buford, Colo., and on a daily basis at Douglas Creek near mouth near Rangely, Colo., in cooperation with the Northwest Colorado Council of Governments.
- 8. Suspended-sediment data are being collected on a comprehensive level at White River near Colorado-Utah State line in cooperation with the Utah Department of Natural Resources.
- 9. Suspended-sediment data are being collected on a comprehensive level at White River near mouth near Ouray, Utah, in cooperation with the U.S. Bureau of Land Management.
- 10. Suspended-sediment data are being collected on a monthly basis at Yampa River below Diversion, near Hayden, Colo., Yampa River below Craig, Colo., Williams Fork at mouth, near Hamilton, Colo., and at Yampa River below Elkhead, near Craig, Colo., in cooperation with the Environmental Protection Agency.
- 11. Suspended-sediment data are being collected on a periodic basis at Horse Draw near Rangely, Colo., and at Horse Draw at mouth, near Rangely, Colo., in cooperation with the U.S. Bureau of Mines.

Lower Green Subregion

- 1. Suspended-sediment data are being collected on a comprehensive level at Green River near Jensen, Utah and at Green River at Green River, Utah.
- 2. Sediment accumulation in Scofield Reservoir near Scofield, Utah, was surveyed as part of the Coal Hydrology program in cooperation with the U.S. Bureau of Land Management.

Upper Colorado - Dirty Devil Subregion

- 1. Suspended-sediment data are being collected on a twice monthly basis at Colorado River at Lees Ferry, Ariz., in cooperation with the U.S. Bureau of Reclamatior, and as part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at Paria River at White House Ruins, Utah, Paria River below Water Pockets, Ariz. and at Paria River at Lees Ferry, Ariz., in cooperation with the U.S. Bureau of Land Management.

San Juan Subregion

1. Suspended-sediment data are being collected on a monthly basis at Vallecito Creek near Bayfield, Colo., as a part of the National Hydrologic Benchmark Network.

- 2. Suspended-sediment data are being collected on a comprehensive level at Fremont River near Cainville, Utah, in cooperation with the Utah Department of Natural Resources.
- 3. Suspended-sediment data are being collected on a daily basis at Animas River at Farmington, N. Mex., and at San Juan River at Shiprock, N. Mex., as a part of the Federal CBR program.
- 4. Suspended-sediment data are being collected on a monthly basis at La Plata Creek at Colorado-Utah state line and a McElmo Creek at Colorado-Utah state line as a part of the USGS Coal Hydrology Program.
- 5. Suspended-sediment data are being collected on a comprehensive level at San Juan River near Bluff, Utah.

Special Studies

An energy project "Hydrologic Surveillance of Coal Lease Areas in Northwestern New Mexico" was continued. Sediment stations were established throughout the coal lease areas and are financed by Federal CBR and U.S. Bureau of Land Management funds.

As part of the program for the determining baseline conditions in the areas of potential oil-shale development in the White River basin, Utah, suspended-sediment data continued to be obtained monthly at five sites and during times of flow at four sites. This work is in cooperation with the Environmental Protection Agency, the U.S. Bureau of Land Management and the Utah Department of Natural Resources.

For additional information about Geological Survey activities within this region, contact the following offices.

District Chief, WRD
U.S. Geological Survey
Federal Building
301 West Congress Street,
Box FB-44
Tucson, AZ 85701

District Chief, WRD
U.S. Geological Survey
P.O. Box 26659
815 Western Bank Building
505 Marquette, NW
Albuquerque, NM 87125

District Chief, WRD U.S. Geological Survey Box 25046, Mail Stop 415 Denver Federal Center Lakewood, CO 80225

District Chief, WRD
U.S. Geological Survey
Federal Building, Room 8002
125 South State Street
Salt Lake City, UT 84138

District Chief, WRD
U.S. Geological Survey
P.O. Box 1125
J. C. O'Mahoney Federal Center
Room 5017
2120 Capitol Avenue
Cheyenne, WY 82001

UPPER COLORADO REGION

SOIL CONSERVATION SERVICE

 Erosion and sediment yield estimates were made on the following watershed:

a. Public Law 566

Major Drainage	Watershed	County	State
Green River	Red Crk	Sweetwater	WY

Special Study

Erosion maps on 1/50,000 scale were prepared for Rio Blanco and Moffat Counties, Colorado.

Water and Power Resources Service

Water surface profiles for Wolf Creek and Twin Creek were prepared for project conditions and a scour estimate for Wolf Creek Siphon crossing for Strawberry Aqueduct was prepared. The scour estimate of 1.2 m (4.0 ft) was determined by averaging Lacey's, Blench's, Mean Water Depths, Liu's, and Navajo Indian Irrigation Project Scour vs. unit discharge methods.

A field trip in May was made to the reach of channel in the East Fork of the Smith's Fork River below Stateline Dam to gather base data for a sediment transport study. Cross sections were surveyed and suspended samples were taken for each cross section at 4.5 m/s (160 ft/s) or at 5.4 m/s (190 ft/s). Bed material samples were taken at two locations and a sample of material that has been deposited in the channel was also collected. Another set of suspended sediment samples and water surface elevation data were collected at five locations in the 8.8 km (5.5 mi) reach just downstream of Stateline Dam during July when the discharge was 8.2 m/s (290 ft/s).

Sediment sampling equipment and field training were provided on sampling techniques to the Southwest Regional Office and private contractor, Bio/West Inc., for the sediment sampling phase of the San Juan River Environmental Study being conducted on San Juan River below Navajo Dam.

LOWER COLORADO REGION

GEOLOGICAL SURVEY

Lower Colorado-Lake Mead Subregion

1. Suspended-sediment data were collected on a monthly basis at the following sites in cooperation with the U.S. Bureau of Land Management (discontinued November 1979):

Virgin River near Bloomington, Utah Virgin River above I-15 Rest Area, Ariz. Virgin River below I-15 Rest Area, Ariz. Virgin River at Mouth of Narrows, Ariz. Virgin River at Littlefield, Ariz.

2. Suspended-sediment data are being collected on a monthly basis at the following sites as part of the National Stream Quality Accounting Network (NASQAN):

Virgin River above Halfway Wash near Riverside, Nev. Muddy River above Lake Mead near Overton, Nev.

- 3. Suspended-sediment data are being collected at North Fork Virgin River above Zion Narrows, near Glendale, Utah, in cooperation with the Utah Department of Natural Resources.
- 4. Suspended-sediment data are being collected monthly at Las Vegas Wash near Henderson, Nev., and twice-monthly at Las Vegas Wash near Boulder City, Nev., in cooperation with the U.S. Water and Power Resources Service.

Little Colorado Subregion

1. Suspended-sediment data are being collected on a monthly basis at the following sites in cooperation with the Arizona Department of Health Services:

Little Colorado River at Greer, Ariz. Little Colorado River above Lyman Lake, near St. Johns, Ariz. Show Low Creek near Lakeside, Ariz.

2. Suspended-sediment data are being collected on a daily basis in cooperation with the U.S. Corps of Engineers at:

Little Colorado River at Holbrook, Ariz. Little Colorado River near Joseph City, Ariz.

- 3. Suspended-sediment data are being collected on a flow event basis at Leroux Wash near Holbrook, in cooperation with the U.S. Corps of Engineers.
- 4. Suspended-sediment data are being collected on a daily basis at Moenkopi Wash near Moenkopi, Ariz.
- 5. Suspended-sediment data are being collected on a monthly basis at Little Colorado River at Cameron, as a part of NASQAN.

Lower Colorado Subregion

1. Suspended-sediment discharge are being collected at the following sites in cooperation with the Bureau of Land Management:

Boulder Creek above Copper Creek, near Bagdad, Ariz. Copper Creek near mouth, near Bagdad, Ariz. Boulder Creek near mouth, near Bagdad, Ariz. Burro Creek above Boulder Creek, near Bagdad, Ariz. Burro Creek at US 93 Bridge, near Bagdad, Ariz. Big Sandy River near Wikieup, Ariz. Bill Williams River near Planet, Ariz. Burro Creek at old US 93 Bridge, near Bagdad, Ariz.

2. Suspended-sediment data are being collected on a monthly basis as a part of NASQAN at:

Colorado River below Hoover Dam, Ariz.
Bill Williams River near Planet, Ariz.
Colorado River above Imperial Dam, Ariz.
Colorado River at northerly international boundary, above Morelos Dam, near Andrade, Calif.

3. Suspended-sediment data are being collected on a monthly basis at Colorado River below Parker Dam, Arizona-California, and at Yuma Main Drain at Southerly International Boundary, near San Luis, Ariz., in cooperation with the Arizona Department of Health Services.

Upper Gila Subregion

- 1. Suspended-sediment data are being collected on a monthly storm-event basis at Mogollon Creek near Cliff, N. Mex. as a part of the National Hydrologic Benchwork Network.
- 2. Suspended-sediment data are being collected on a monthly basis at Gila River near Redrock, N. Mex., as part of NASQAN, and at San Francisco River near Glenwood, N. Mex. in cooperation with New Mexico Interstate Streams Commission.
- 3. Suspended-sediment data are being collected on a monthly basis at the following sites in cooperation with the Arizona Department of Health Services:

Gila River near Clifton, Ariz. San Francisco River near Clifton, Ariz. Gila River at Head of Safford Valley, near Salomon, Ariz.

4. Suspended-sediment data are being collected on a monthly basis at Gila River at Calva, Ariz., as a part of NASQAN.

Middle Gila Subregion

1. Suspended-sediment data are being collected on a monthly basis at the following sites in cooperation with the Arizona Department of Health Services:

Gila river at Winkelman, Ariz. Santa Cruz River at Rio Rico, Ariz.

2. Suspended-sediment data are being collected on a monthly basis as a part of NASQAN at:

San Pedro River at Winkelman, Ariz. Gila River at Kelvin, Ariz. Santa Cruz River near Laveen, Ariz.

3. Suspended-sediment data are being collected on a weekly basis at Santa Cruz River near Nogales, Ariz., in cooperation with the Arizona Water Commission.

Salt Subregion

1. Suspended-sediment data are being collected on a monthly basis at the following sites, in cooperation with the Arizona Department of Health Services:

Black River near Fort Apache, Ariz.
White River near Fort Apache, Ariz.
Salt River near Roosevelt, Ariz.
Tonto Creek above Gun Creek, near Roosevelt, Ariz.
Verde River above Clarkdale, Ariz.
Oak Creek at Sedona, Ariz.
Oak Creek at Red Rock Crossing, near Sedona, Ariz.
Oak Creek near Cornville, Ariz.
Verde River near Camp Verde, Ariz.
Gila River below Gillespie Dam, Ariz.

- 2. Suspended-sediment data are being collected on a monthly basis at Wet Bottom Creek near Childs, Ariz., as a part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected on a monthly basis as a part of NASQAN at:

Salt River below Stewart Mountain, Dam, Ariz. Verde River below Bartlett Dam, Ariz.

Lower Gila Subregion

1. Suspended-sediment data are being collected on a monthly basis as $\hat{\epsilon}$ part of NASQAN at:

Gila River above diversions, at Gillespie Dam, Ariz. Gila River near mouth, near Yuma, Ariz.

Sonora Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Sar Simon Wash near Pisinimo, Ariz., in cooperation with the U.S. Bureau of Indian Affairs.
- 2. Suspended-sediment data are being collected on a monthly basis as ϵ part of NASOAN at:

Vamori Wash at Kom Vo, Ariz. Whitewater Draw near Douglas, Ariz.

Special Studies

Sediment data were collected during periods of flow at two small water-sheds in the area of strip mining along Coal Mine Wash and Coal Mine Wash at mouth near Kayenta, Ariz., as part of a study pertaining to the effects of strip mining and rehabilitation of spoil piles on the sediment yield.

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD
U.S. Geological Survey
Federal Building
301 West Congress Street,
Box FB-44
Tucson, AZ 85701

District Chief, WRD U.S. Geological Survey P.O. Box Box 26659 815 Western Bank Building 505 Marquette, NW Albuquerque, NM 87125 District Chief, WRD U.S. Geological Survey Federal Building, Room 227 705 North Plaza Street Carson City, NV 89701

District Chief, WRD U.S. Geological Survey Federal Building, Room 8002 125 South State Street Salt Lake City, UT 84138

LOWER COLORADO REGION

SOIL CONSERVATION SERVICE

- 1. Sediment yield was calculated for the design storm for Reach II of the Roosevelt Water Conservation Floodway in the following watershed:
 - a. Public Law 566

Major Drainage	Watershed	Stream	County	State
Gila River	Williams-Chandler	RWCD Floodway	Pinal	AR

b. River Basin Investigation

An erosion map was completed for the following river basin:

Major Basin	Basin Reported	<u>State</u>
Colorado River	Little Colorado River	AR

c. Salinity Study

Erosion and sediment relative to contribution to salinity in the Virgin River was estimated for the Moapa Valley area, Nevada.

Non-Point Pollution Studies

County sediment control plans were completed for the New Mexico counties in the region. The state sedimentation study was completed and the New Mexico Water Quality Control Commission accepted the Overall Water Quality Management Plan in May 1979. These plans and studies were done under PL 92-500, Section 208, Non-point Source Pollution. A detailed work plan for continued 208 studies was submitted to the Environmental Protection Agency and accepted December 1979.

LOWER COLORADO REGION

Water and Power Resources Service

Scour estimates for all overchutes on the Granite Reef Aqueduct of the Central Arizona Project for Reaches 9, 10, and 12 were 1.1 m (3.5 ft) at the upstream end and 1.5 to 1.8 m (5 to 6 ft) for the downstream ends. Fifty-year sediment inflow values were determined using the Water and Power Resources Service Southwestern United States sediment yield curve. Sediment deposition was 3 determined using Churchill's curve. A 50-year sediment volume of 12,200 m (9.9 acre-feet) was derived for the small area of 10.2 ha (25.1 acres) above station 695+00 on Granite Reef Aqueduct - Reach 12 which will be stored with no outlet so all sediment will be retained. For cross drainage structures occurring in Reach 3 where sediment estimates were required the equation: yield = $1.098A^{-0.24}$ was used. This gives yield in m^3/km^2 per year with the drainage area size A in km^2 .

A representative attended a meeting in Boulder City, Nevada, concerning Protection of Las Vegas Valley Lateral Crossing of Las Vegas Wash from possible scour damage. The meeting was held with representatives of the Water and Power Resources Service, the State of Nevada, and Southern Nevada Water System. The group flew over the headcut on Las Vegas Wash that is a threat to the lateral. It was agreed to provide data on prediction on rate of headcut, how the headcut could be stopped, and cost of a structure to control the headcut for a meeting of the Technical Advisory group for the Southern Nevada Water System. A study of the problem showed that a 6.1 m to 9.1 m (20 to 30 ft) headcut would reach the pipe on or before January 1980 (14 percent probability) or with a 50 percent probability to reach the pipe by December 1979. A grade control structure constructed downstream from the crossing prior to January 1980 would cost approximately 2 to 3 million dollars.

For Dominguez Dam a longitudinal profile sediment distribution study was made in order to define the depth of sediment of 7.6 m (25 ft) at the inlet to the Rim Basin Pumping Plant. The 100-year sediment volume of 19.3 x $10^6 \mathrm{m}^3$ (15,300 acre-feet) in the delta, 8.7 x $10^6 \mathrm{m}^3$ (7,100 acre-feet) immediately behind the dam, and 31.7 x $10^6 \mathrm{m}^3$ (25,700 acre-feet) in the intervening reach.

On Twin Lakes, Charleston Heights, and Robinson Laterals on Southern Nevada Water Project a revised scour depth of 0.9 m (3.0 ft) for Rate-of-Flow-Control Station on Twin Lakes Lateral and 1.2 m (4.0 ft) for Mesa Lateral was determined by averaging results from scour depths using Lacey's, Blench's, Mean Water Depth, and Navajo Indian Irrigation Project Scour vs. unit discharge methods.

GREAT BASIN REGION

GEOLOGICAL SURVEY

Bear Subregion

- 1. Suspended-sediment data are being collected on a monthly and storm-event basis at Twin Creek at Sage, Wyo., in cooperation with the U.S. Bureau of Reclamation.
- 2. Suspended-sediment data are being collected on a monthly-storm event basis at Bear River at Border, Wyo., as a part of the U.S. Geological Survey Coal Hydrology program.

Great Salt Lake Subregion

1. Suspended-sediment data are being collected on a monthly basis at Red Butte Creek at Fort Douglas, near Salt Lake City, Utah, as part of the National Hydrologic Benchmark Network.

Black Rock Desert-Humboldt Subregion

1. Suspended-sediment data are being collected monthly at the following sites as part of the National Stream-Quality Accounting Network (NASQAN):

Humboldt River near Carlin, Nev. Humboldt River near Imlay, Nev. Humboldt River near Rye Patch, Nev. Quinn River near McDermitt, Nev.

Central Lahontan Subregion

1. Suspended-sediment data are being collected monthly at the following sites as part of NASQAN:

Walker River near Wabuska, Nev. Carson River near Churchill, Nev. Truckee River near Nixon, Nev.

- 2. Suspended-sediment data are being collected at frequencies that vary from monthly to more than twice-monthly at seven sites in the Carson River basin in cooperation with the Nevada Division of Environmental Protection.
- 3. Suspended-sediment data are being collected twice-yearly at the following sites in cooperation with the U.S. Army Corps of Engineers:

Martis Creek at Highway 267 near Truckee, Calif. Martis Creek Lake near Truckee, Calif. Martis Creek near Truckee, Calif.

4. Suspended-solids data are being collected twice-monthly at the following sites in cooperation with the U.S. Environmental Protection Agency:

Truckee River at Farad, Calif. Truckee River at Lockwood, Nev.

Central Nevada Desert Basins Subregion

1. Suspended-sediment data are being collected monthly at the following sites as part of NASQAN:

Steptoe Creek near Ely, Nev. South Twin River near Round Mountain, Nev. Chiatovich Creek near Dyer, Nev.

Special Studies

An investigation of fluvial sediment hazards to potential urban areas was continued in cooperation with the Nevada Bureau of Mines and Geology. The initial area of study was Washoe Valley, a suburban valley between the urban areas of Reno and Carson City, Nevada. Similar work has also been done in

the South Lake Tahoe Area, Carson City area, and in Las Vegas Valley. Results are shown as maps of potentially hazardous areas with respect to both flooding and sediment transport, and are published by the Nevada Bureau of Mines and Geology.

Some sediment-transport data are being collected from the Truckee and Carson Rivers as part of a two-year water-quality assessment study of these drainages in Nevada. Additional data are being collected from the Carson River as part of a nutrient loading study of Lahontan Reservoir, Nevada.

A two-year study of the relations between fluvial-sediment transport and engineered rehabilitation of erosion in the First Creek basin of Incline Village, north Lake Tahoe, was begun in October 1979. Numerous data are being collected to evaluate effects of planned erosion-control measures in this urbanized basin. Data include sediment and nutrient concentrations and particle-size distribution of transported sediment.

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD
U.S. Geological Survey
Federal Building, Room 227
705 North Plaza Street
Carson City, NV 89701

District Chief, WRD U.S. Geological Survey Federal Building, Room 8002 125 South State Street Salt Lake City, UT 84138 District Chief, WRD
U.S. Geological Survey
P.O. Box 1125
J. C. O'Mahoney Federal Center
Room 5017
2120 Capitol Avenue
Cheyenne, WY 82001

PACIFIC NORHTWEST REGION

CORPS OF ENGINEERS

North Pacific Division

Portland District

Sediment sampling was conducted at two stations on Rogue River for post-impoundment and for planning and design purposes, respectively. Data are being maintained on suspended sediment, bed load, dissolved solids, temperature, turbidity, conductivity, pH and dissolved oxygen.

Information on sedimentation ranges is listed below:

1. Project: Lost Creek Reservoir

Activity: Installing monuments and surveying sedimentation ranges. All 22 designated ranges have been surveyed and tied in. The draft report will be finalized by 1 October 1980.

Purpose: Initial survey of reservoir and upstream and downstream channels for later evaluation of aggradation, degradation, and siltation.

Type of survey: Range Survey

Elements measured: Position of monuments, profile of ground surface and river sections.

Equipment used: Survey scope.

2. Project: Applegate Reservoir

Activity: Installing monuments and surveying sedimentation ranges. There are designated ranges which are being surveyed and tied in. The draft report will be finalized by 1 October 1980.

Purpose: Initial survey of reservoir and upstream and downstream channels for later evaluation of aggradation, degradation, and siltation.

Type of survey: Range Survey

Elements measured: Position of monuments, profile of ground surface and river sections.

Equipment used: Survey scope.

Seattle District

The following table indicates the reservoir sediment range resurveyed made in 1979:

Project	Ranges Resurveyed
Howard A. Hanson	9
Libby	17
Wynoochee	6

Walla Walla District

For Lower Granite Reservoir, the following ranges were resurveyed:

1. Forty-four ranges on the Snake River between R.M. 107.7 and R. M. 149.0.

- 2. Three ranges on Asotin Creek, tributary to the Snake River, at R. M. 145.34.
- 3. Twenty-four ranges on Clearwater River between R. M. 0.67 and R. M. 7.85.

In addition to sediment ranges measured on the Clearwater River, some random soundings were taken on the Clearwater River between R. M. 0.0 and 2.0.

The suspended sediment and bedload sediment sampling program at the stream gaging stations, Snake River near Anatone, and Clearwater at Spalding was completed in 1979. This program was started in March 1972 and ran continuously through FY 1979. Future sampling is not anticipated at the present time.

PACIFIC NORTHWEST REGION

GEOLOGICAL SURVEY

Kootenai-Pend Oreille-Spokane Subregion

- 1. Suspended-sediment data are being collected on a periodic basis from Pend Orielle River at international boundary and at Spokane River at Long Lake, Wash., as a part of the National Stream Quality Accounting Network (NASQAN).
- 2. Suspended-solids data are being collected at Spokane River at Riverside State Park as part of the National Water Quality Surveillance System in cooperation with the U.S. Environmental Protection Agency.
- 3. Suspended-sediment data are being collected on a daily basis at Kootenai River near Copeland, Idaho, as part of the U.S. Geological Survey waterwaystreaty program.

Upper Columbia Subregion

- 1. Suspended-sediment data are being collected on a periodic basis at Columbia River at Northport, Wash., at Columbia River at Vernita Bridge, near Priest Rapids Dam, Wash., and at Okanogan River at Malott, Wash., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a periodic basis at Andrews Creek near Mazama, Wash., as a part of the National Hydrologic Benchmark Network.
- 3. Monthly suspended-sedient data are being collected at the following sites as part of NASQAN:

Clark Fork below Missoula, Mont. Flathead River at Flathead, British Columbia Flathead River at Columbia Falls, Mont.

- 4. Suspended-sediment data are being collected on a quarterly basis at Columbia River at Richland, Wash., in cooperation with the U.S. Department of Energy.
- 5. Suspended-sediment data are being collected on a daily basis from irrigation return flows at three sites and periodically from irrigation delivery flows at twenty-two sites on the Royal Slope in Washington, as part of a study of best-management practices in cooperation with the Washington State University.
- 6. Suspended-sediment data are being collected on a daily basis from EL 68 wasteway near Othello, Wash.

Yakima Subregion

- 1. Suspended-sediment data are being collected on a daily basis at Yakima River at Kiona, Wash., in cooperation with the Washington State Department of Ecology.
- 2. Suspended-sediment data re being collected periodically at Yakima River near Union Gap, Wash., as part of NASQAN.
- 3. Suspended-sediment data are being collected on a daily basis from irrigation-return flows at four sites near Sunnyside, Wash., in cooperation with the Washington State Department of Ecology.

Upper Snake Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Cache Creek near Jackson, Wyo., as a part of the National Hydrologic Benchmark Network.
- 2. Suspended-sediment data are being collected on a monthly basis and at Snake River near Heise, Idaho, as a part of NASQAN.
- 3. Suspended-sediment data are being collected on a periodic basis at Blackfoot River above reservoir near Henry, Idaho, Blackfoot River near Blackfoot, Idaho, Portneuf River at Pocatello, Idaho, and at Bruneau River near Hot Spring, Idaho, in cooperation with the Idaho Department of Water Resources.

Middle Snake Subregion

- 1. Suspended-sediment data are being collected at various flow rates at Snake River at King Hill, Idaho, as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a monthly basis at Big Jacks Creek near Bruneau, Idaho, as a part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected on a periodic basis at Mores Creek near Arrowrock Dam, Idaho, and at Weiser River near Weiser, Idaho, in cooperation with the Idaho Department of Water Resources.

Lower Snake Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Salmon River near White Bird, Idaho, and Clearwater River at Spalding, Idaho, as part of NASQAN.
- 2. Suspended-sediment data are being collected on a periodic basis at Lapwai Creek near Lapwai, Idaho, and at Palouse River near Potlach, Idaho, in cooperation with the Idaho Department of Water Resources.

- 3. Suspended-sediment data are being collected at Snake River at Burbank, Wash., as a part of NASQAN.
- 4. Suspended-sediment data are being collected on a periodic basis at Minam River at Minam, Oreg., as a part of the National Hydrologic Benchmark Network, and at Owyhee River near Owyhee, Oreg., as part of NASQAN.

Middle Columbia Subregion

- 1. Suspended-sediment samples are being collected on a monthly basis at John Day River near McDonald Ferry, Oreg., at Klickitat River near Pitt, Wash., and at Deschutes River near Biggs, Oreg., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a daily basis at Bear Creek near Prineville, Oreg., in cooperation with the U.S. Bureau of Land Management.

Lower Columbia Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Columbia River at Warrendale, Oreg., Lewis River at Ariel, Wash., and at Cowlitz River at Kelso, Wash., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a daily basis at Bull Run River near Multnomah Falls, Oreg., South Fork Bull Run River near Bull Run, Oreg., North Fork Bull Run River near Multnomah Falls, Oreg., and at Fir Creek near Brightwood, Oregon, in cooperation with the city of Portland, Oreg., to provide some information needed to define the effects of activities in the basin.

Willamette Subregion

1. Suspended-sediment data are being collected on a monthly basis from Tualatin River at West Linn, Oreg., and at Willamette River at Portland, Oreg., as a part of NASQAN.

Oregon-Washington Coastal Subregion

- 1. Suspended-sediment data are being collected on a monthly basis at Rogue River near Agress, Oreg., Umpqua River near Elkton, Oreg., Siuslaw River near Mapleton, Oreg., Alsea River near Tidewater, Oreg., Nehalam River near Foss, Oreg., Chehalis River at Porter, Wash., Willapa River near Willapa, Wash., and at Queets River near Clearwater, Wash., as a part of NASQAN.
- 2. Suspended-sediment data are being collected at North Fork Quinault River near Amanda Park, Wash., as part of the National Hydrologic Benchmark Network.

- 3. Suspended-sediment, bedload, and particle-size data are being collected at Soleduck River at mouth near La Push, Wash., Bogachiel River near La Push, Wash., Calawah River at mouth near Forks, Wash., and at Dickey River near Mora, Wash., in cooperation with the U.S. Corps of Engineers, Seattle District.
- 4. Suspended-sediment data are being collected on a daily basis by an automatic sampler at Elliott Creek near Copper, Oreg., in cooperation with the U.S. Forest Service.
- 5. Suspended-sediment data are being collected on a daily basis by automatic samplers at Rogue River below Prospect, Oreg., at South Fork Rogue River, south of Prospect, Oreg., and at Rogue River at McCloud, Oreg., in cooperation with the U.S. Corps of Engineers.
- 6. Suspended-sediment data are being collected on a periodic basis at Big Butte Creek near McCloud, Oreg., at Elk Creek near Trail, Oreg., and Rogue River at Dodge Bridge, Oreg.

Puget Sound Subregion

- 1. Suspended-sediment data are being collected on a periodic basis at Elwha River at McDonald Bridge near Port Angeles, Wash., Skagit River near Mount Vernon, Wash., Snohomish River near Monroe, Wash., and at Puyallup River at Puyallup, Wash., as a part of NASQAN.
- 2. Suspended-sediment data are being collected on a daily basis at four sites in May Creek drainage.
- 3. Suspended-sediment data are being collected during selected storm-runoff periods at three sites in the Bellevue Urban Study area in cooperation with the City of Bellevue, Wash.

Oregon Closed Basins Subregion

1. Suspended-sediment data are being collected on a monthly basis at Donner und Blitzen River near Frenchglen, Oreg., as a part of NASQAN.

Special Studies

During 1979, suspended and bedload-transport data were collected in the Snake and Clearwater Rivers in the vicinity of Lewiston, Idaho.

Suspended-sediment data are being collected on a daily basis in the Rock Creek drainage near Twin Falls, Idaho, in the Marsh Creek drainage near InKam, Idaho, and in the Cedar Draw drainage near Filer, Idaho.

For additional information about Geological Survey activities within this region, contact the following offices:

District Chief, WRD U.S. Geological Survey Box 036 Federal Building, Room 365 550 West Fort Street Boise, ID 83724

District Chief, WRD U.S. Geological Survey 830 Northeast Holladay Street Portland, OR 97232

District Chief, WRD
U.S. Geological Survey
P.O. Box 1125
J. C. O'Mahoney Federal Center
Room 5017
2120 Capitol Avenue
Cheyenne, WY 82001

District Chief, WRD U.S. Geological Survey 301 South Park Avenue Federal Building, Room 428 Drawer 10076 Helena, MT 59601

District Chief, WRD U.S. Geological Survey 1201 Pacific Avenue, Suite 600 Tacoma, WA 98402

PACIFIC NORTHWEST REGION

SOIL CONSERVATION SERVICE

 Studies of erosion and sediment yields were made in the following watersheds:

a. Public Law 566

Major Drainage	Watershed	Stream	County	<u>State</u>
Columbia River	East Wenatchee	Wenatchee R.	Chelan	WA

Sediment yield estimates were made to the watershed mouth with and without proposed works of improvement. Proposed works include a diversion system with a pipe entering directly into the river. Terraces and other land treatment practices were evaluated on the sediment yield calculations.

Little Salmon Brundage Goose Crk Valley ID

b. River Basin Investigation

Major Basin	Basin Reported	State
Columbia	Middle and Lower Snake River	ID

An inventory of erosion and sedimentation conditions was begun on the middle and lower Snake River Basins. This study will develop sediment delivery ratios by land capability unit and land use and identify conservation practices that will reduce erosion and sediment yield from cropland, rangeland, and forest and recreation lands. This data will be used in a linear programming model to predict future erosion rates for different combinations of conservation practices.

c. Non-point Pollution Study

Area	Counties	State
North Central	Wasco, Sherman, Gilliam, Morrow, Umatilla	OR

Two watershed areas are being evaluated as a sample to extrapolate to the five county area.

Special Study

Sediment deposition within the Missouri Flats Watershed, Whitman County, Washington was measured for comparison with the suspended land sediment station located at the mouth of the watershed. This was done jointly with SEA personnel.

PACIFIC NORTHWEST REGION

Water and Power Resources Service

A degradation study and report for Grand Coulee Third Powerplant was prepared that included an analysis of the riverbed and the bank surface stability and recommendations for remedial actions to protect the riverbed and right bank during future peaking operations. Visits were made to the Vicksburg District Office of the Corps of Engineers to discuss river stabilization methods to be employed on the Columbia River downstream from Grand Coulee Dam and to the Grand Coulee Project Office with the study group to examine the 9.7 km (6 mi) reach of the Columbia River below the dam.

A sediment study was prepared on sediment discharges of the Similkameer and Okanogan Rivers. The sediment rating curve derived therein gave an estimated diversion at the Cordell Pumping Plant Site of 203 tonnes (244 tons) and deposition of 107 tonnes (118 tons) of sediment per irrigation season would occur in a settling basin 122 m (400 ft) by 8.5 m (28 ft) by 3.3 m (10 ft) deep. A meeting was held to discuss the design for model studies of a below-streambed filter for excluding sediments from the irrigation waters. If a filter was used instead of a settling basin 0.15 m (0.5 ft) deep of 50 mm particles this would probably protect a filter placed below it from erosive forces.

A scour study for the Similkameen River Siphon crossing was prepared. Using surveyed cross sections on the Okanogan and Similkameen Rivers a water surface profile for the 100-year flood of 1,250 m 3 /s (44,000 ft 3 /s) was computed. The hydraulics were then used to estimate a scour depth at the siphon of 3.3 m (10 ft).

A field inspection of the sand problems that the Tualatin Valley Irrigation District is experiencing at the Spring Hill Pumping Plant on the Tualatin River was made and bed material samples were collected above, at, and below the pumping plant. The short-range solution to the problem is removal of the rock weir across the channel in front of the plant and relocating it downstream. The long-range solution includes three alternatives that will require feasibility studies.

CALIFORNIA REGION

CORPS OF ENGINEERS

South Pacific Division

Los Angeles District

Reservoir sedimentation Data Summary Sheets (ENG Form 1787) for twelve basins are completed. These basins are: Big Tujunga, Pacoima and Santa Anita Flood Control Basins and Bailey Canyon, Beatty, Big Dalton, Carter Englewild, Gordon, Harrow, Little Dalton, and Sierra Madre Villa Debris Basins.

Sacramento District

Routine samples of lake outflows were collected and analyzed for suspended sediment of Black Butte, Pine Flat, Kaweah, Success and Isabella Lakes.

Samples for total and suspended sediment were collected at numerous sites on the Sacramento River.

Daily samples for total sediment were collected on Cottonwood Creek during periods of high flow.

San Francisco District

Sedimentation activities during 1979 consisted of obtaining data on sediment transport and turbidity in connection with water resources projects being studied, currently authorized, under construction or in operation. These activities are summarized below:

Sedimentation Studies for Water Resources Projects

1. There are six cooperative sediment sampling stations currently in operation in the San Francisco District. The long term sediment sampling station on the Eel River near Scotia was added to the cooperative program when funding for the station was dropped from the State of California budget. Data from this station will be used in the ongoing Eel River Basin Study. Data from the other five stations will be used to evaluate the effects of the Coyote Dam-Lake Mendocino and Warm Springs Dam-Lake Sonoma Projects on the sedimentation characteristics of Dry Creek and the Russian River and to evaluate the sediment transport characteristics of Wildcat Creek and Corte Madera Creek. The data gathered on Wildcat Creek and Corte Madera Creek will be used to develop maintenance requirements associated with the authorized flood control projects on these streams.

- 2. A program designed to monitor the turbidity of inflow to and released from Lake Mendocino has been in operation since March 1973. Measurements are made biweekly by reservoir operations personnel under the guidance of the U. S. Geological Survey (USGS). The data are then published in the USGS Water Supply Papers.
- 3. The turbidity monitoring program being conducted for the Warm Springs Dam-Lake Sonoma Project was continued in 1979. Water quality samples taken four times a year at four stations above the damsite are analyzed for turbidity to augment the turbidity data being gathered at the cooperative sediment sampling station, Dry Creek near Geyserville.

CALIFORNIA REGION

GEOLOGICAL SURVEY

Klamath - Northern California Coastal Subregion

- 1. Lumbering and sawmill operations at the preriphery of Redwoods National Park, Calif., may load the streams entering the park with sediment and unwanted nutrients. A study is being made to determine the present rates of sediment transport, the chemical quality, and the level of nutrients of the streams at the periphery and within the park, and to provide an overall appraisal of water resources in the park. Two data releases covering the period September 1, 1973 through September 30, 1975, have thus far been published. The study will aid the National Park Service in developing and protecting the water resources and ecological system in the park. Work is being done in cooperation with the National Park Service.
- 2. The Grass Valley Creek project is a continuing total-load data-collection program in cooperation with the California Department of Water Resources. The study was begun in 1976 to determine the amount of sediment contributed by Grass Valley Creek to the Trinity River below Lewiston Dam.

Sacramento Subregion

- 1. A report on the trap efficiency of Highland Creek Reservoir near Kelseyville, Calif., is in preparation. This study was made in cooperation with the U.S. Soil Conservation Service.
- 2. The Cottonwood Creek project is a continuing total-load data-collection program for the U.S. Corps of Engineers. Sediment data are being collected to determine sediment discharge at two dam sites and at a site near the mouth of Cottonwood Creek.
- 3. The Sacramento River Bank Stabilization Project is a data-collection program for the U.S. Corps of Engineers. The purpose of the study is to determine sediment sources and sinks and modes of transport for the Sacramento River and major tributaries of the Sacramento. During 1979, total-load data were collected at 13 sites and suspended-load data were collected at one site. Bed-material samples and cross-section surveys were obtained at 37 additional sites to provide data for a HEC-6 sediment-transport model in preparation by the U.S. Corps of Engineers. In addition, one data set was obtained for the Bend Study, a program designed to provide velocity-vector data as at river bend for the U.S. Corps of Engineers.
- 4. The Delta Turbidity Project is a continuing data-collection program in cooperation with the California Department of Water Resources. The purpose of the project is to determine suspended-sediment discharge and turbidity for the Sacramento and San Joaquin Rivers near their mouths.
- 5. The Peripheral Canal Sediment Project is designed to provide sediment-transport information in the vicinity of the proposed Peripheral Canal Diversion site near Hood, Calif. In 1979, periodic data were obtained to determine the vertical and

lateral variability in velocity, suspended-sediment concentration, and percentage of sand in suspension. The study was made in cooperation with the California Department of Water Resources.

San Francisco Bay Subregion

- 1. A report on sediment transported by streams tributary to San Francisco Bay, Calif., is in preparation. Short-term sediment discharge records were used to estimate annual sediment discharge during the period 1909-66.
- 2. A combination scientific and land-use planning report of Napa and Sonoma Counties in the San Francisco Bay, Calif., region is being prepared as a culmination of geomorphic studies begun in 1971. The report is based on a four-step procedure that defines the relations among terrain properties, land use activities, and erosional problems. The four steps are: (1) identification of land use activities, (2) collation of the critical physical factors that control land-surface stability, (3) mapping of erosional and depositional features, and (4) production of a matrix relating land-use activities to erosional and depositional province disturbance potential. Study is part of the USGS-HUD San Francisco Bay, Calif., Regional Study.
- 3. The Cull Canyon Project is a data-collection program to determine major sources of sediment upstream from Cull Canyon Reservoir. The study is being made in cooperation with the Alameda County Flood Control and Water Conservation District.
- 4. The Lake Temescal Project is designed to determine sediment yield from various upper-basin sources and major tributaries upstream from Lake Temescal. The study is being made in cooperation with the East Bay regional Park District.

Central California Coastal Subregion

A study to determine the effect of the Marble Cone Fire (August 1977), near Big Sur, Calif., on sedimentation in Los Padres Reservoir near Carmel Valley, Calif., is underway. Reservoir surveys were made in November 1977 and September 1978. Surveys will be continued on an annual or biannual basis to monitor future changes in storage capacity. This study was made in cooperation with the Monterey Peninsula Water Management District and the U.S. Forest Service.

Southern California Coastal Subregion

1. The project, "Effects of river modifications and control structures in the Santa Clara River Basin, Ventura and Los Angeles counties, California," is in progress. The study will document the effects of rivercontrol structures and of sand-and-gravel mining on streamflow, phreatophyte growth, channel morphology, and sediment transport in the Santa Clara River basin. Sediment delivery to the shoreline and sediment size, quantity, and relation to beach stability will also be examined.

2. An assessment of the impacts of off-road-vehicle use in the Canada de Los Alamos basin has been completed and is published as follows:

Knott, J. M., 1980, Reconnaissance Assessment of Erosion and Sedimentation in the Canada de Los Alamos Basin, Los Angeles and Ventura Countries, California: Menlo Park, California, U.S. Geological Survey Water-Supply Paper 2061

3. A study to estimate long-term total sediment discharge in the Santa Clara River basin has been completed. The study includes estimates of sediment discharge under both natural and actual (reservoir development) conditions. A final report is published as follows:

Williams, R. P., 1979, Sediment Discharge in the Santa Clara River Basin, Ventura and Los Angeles Counties, California: Menlo Park, California, U.S. Geological Survey Water-Resources Inv. 79-78, 51 p.

For additional information about Geological Survey activities within this region, contact the following office:

District Chief, WRD U.S. Geological Survey 855 Oak Grove Avenue Menlo Park, CA 94025

CALIFORNIA REGION

SOIL CONSERVATION SERVICE

1. Studies of sediment damages and determination of sediment yields were made in the following watersheds:

a. Public Law 566

Major Drainage	Watershed	Stream	County(s)	<u>State</u>
Tulare Subregion	Tehachapi	Tehachapi	Kern	CA
Suisun Bay	Lower Pine Crk	Pine Crk	Contra Costa	CA

Non-Point Pollution Studies

Twenty-eight mini-reports (four for each of seven Pilot Study Areas) and a "Recommended Plan of Best Management Practices, Agricultural Sediment, Central Valley Region, California, 1979," report were published as basic data for a "208" water quality management plan developed by the State of California. The pilot study areas are:

Pilot Study Area	County	State
Red Bank Crk	Tehama	CA
Buckeye-Dunnigan Crk	Yolo	CA
Morlar Flats	Fresno	CA
Willow Crk	Lassen	CA
Georgetown, Camino-Fruitridge	EL Dorado	CA
Citrus Cove	Fresno	CA
Spanish Grant District and Crow Crk	Stanislaus	CA

Special Study

The Highland Creek Sediment Study in Lake County, California is being discontinued. The purpose of the study was to compare predicted sediment yield using the USLE to measured sediment deposition in two small ponds. Observations made in late 1979, indicated that removal of cover by mechanical means had ceased and cover conditions were excellent.

Land use data was brought up to date on the six reservoirs that are included in the National Sediment Survey of Selected Reservoirs.

CALIFORNIA REGION

Water and Power Resources Service

The 5-, 10-, 50-, and 100-year flood peaks for two areas near inlet portal and one area at outlet portal for the Santa Clara Tunnel, San Felipe Division, were estimated. Water surface profiles and scour estimates of 1.5 m (5.0 ft) for the channel at outlet portal were also estimated.

Water surface profile and scour estimates were prepared for relocation of Petroleum Creek Siphon and O&M Bridge on the Tehama-Colusa Canal. Scour estimates at both points are 1.5 m (5.0 ft) as determined by averaging results from scour depths using Blench's, Lacey's, Mean Water Depth, and the Navajo Indian Irrigation Project Scour vs. unit discharge methods.

A rough draft was reviewed of the Sediment Discharge Analysis of Appendix B to the Trinity River Basin Fish and Wildlife Management Program prepared by Frederiksen, Kamine, and Associates, Inc. of Sacramento, California. A flow duration, sand discharge rating curve procedure was recommended as a check or the method for estimating sand discharge budgets. Check computations for the Grass Valley Creek sediment yield showed 0.35 tonne/km² (3,380 tons/mi²) per year based on data from near Fawn Lodge. A suspended sediment rating curve and a total sediment rating curve were developed and used in conjunction with a flow duration curve in the analysis.

The Trinity River Basin Fish and Wildlife Comprehensive Action Program Draft Report by VTN Consolidated, Inc. on Fish and Wildlife Management options was reviewed. This report presented many proposals involving channelization, removal of vegetation, construction of groins, placement of large boulders in the channel, removal of channel constrictions, construction of more pools and riffles, addition of gravels, and removal of sand from the Trinity River Channel. All of these proposals on the mainstem and tributaries were not evaluated from a sediment transport, morphologic, or stability approach which will be needed for proper design.

A field trip was made to the Trinity River Basin in California to collect data for a sediment transport study. Data were collected at 10 locations in a $8.0~\rm km$ (5 mi) study reach for discharges $8.5~\rm m^3/s$ (300 ft³/s) and 17.0 m³/s (600 ft³/s) which included flow measurements, water surface elevations, suspended sediment samples, bed material samples, water temperature, and bedload measurement. The bedload was measured using a Helley-Smith hand sampler; suspended samples were collected using a DH-48; and bed materials were sampled using a clam-shell sampler. A sediment transport study is being conducted as part of a task force program to eliminate sand from the Trinity River which has damaged the fish habitat.

The sediment deposition problem being experienced at Twitchell Dam of the Santa Maria Project was reviewed, and it was pointed out that solutions may involve raising the outlet works intake or changing the operation of the reservoir.

ALASKA REGION

CORPS OF ENGINEERS

North Pacific Division

Alaska District

The ongoing sediment transport study for the Tanana River near Fairbanks was continued for 1979. The results of this study are contained in the U.S.G.S. open file report, "Sediment Transport in the Tanana River, in the vicinity of Fairbanks, Alaska."

Work was also initiated in 1979 to collect sediment data associated with the Bradley Lake Hydroelectric Project. This data and all other sediment data collected through the Cooperative Stream Gaging Program will be reported in the U.S.G.S. publication, Water Resources Data for Alaska.

ALASKA REGION

GEOLOGICAL SURVEY

Arctic Slope Subregion

1. Suspended-sediment data are being collected on a periodic basis at the Kuparuk River near Deadhorse, Alaska, as part of the National Stream Quality Accounting Network (NASQAN). Suspended-sediment data are being collected infrequently at Colville River near Nooiksut, Alaska, as part of NASQAN.

Northwest Alaska Subregion

1. Suspended-sediment data are being collected on a periodic basis at Kobuk River near Kiana, Alaska, as part of NASQAN.

Yukon Subregion

- 1. A cooperative study with U.S. Corps of Engineers to collect and evaluate sediment-transport and river hydraulic data in the Tanana River near Fairbanks, Alaska, was continued in 1979. Suspended-sediment and bedload data are being collected in the Tanana River at Fairbanks, Alaska, and at Tanana River near the North Pole, Alaska. The Corps of Engineers will use these data in the design and operation of engineering structures on the Tanana River and the regulation of the quarrying of gravel from the river in the vicinity of Fairbanks, Alaska.
- Report: Burrows, R. L., Parks, B., Emmett, W. W., 1977-78, Sediment Transport in the Tanana River in the Vicinity of Fairbanks, Alaska, 1979; U.S. Geol. Survey, open-file report 79-1539, 37 p.
- Report in Preparation: Burrows, R. L., 1979, Cross-section, Velocity, and bed-load data at two sites on the Tanana River near Fairbanks, Alaska, U.S. Geol. Survey, open-file report.
- 2. In cooperation with the Alaska Department of Natural Resources, a study was continued in 1979 to evaluate the geohydrology of the Delta-Clearwater area in relation to the agricultural development in this area. Suspended-sediment data were collected at Clearwater Creek near Delta Junction, Alaska.
- 3. Suspended-sediment data are being collected on a periodic basis at the Yukon River at Pilot Station, Alaska, and on an infrequent basis at Yukon River at Eagle, Alaska, as a part of NASQAN.
- 4. Suspended-sediment data are being collected periodically at the Fortymile River near Steele Creek, Alaska.
- 5. Suspended-sediment data are being collected periodically at the Tanana River at Nenana, Alaska, as part of NASQAN.

Southwest Subregion

1. Suspended-sediment data are being collected on a periodic basis at Kuskokwim River at Crooked Creek, Alaska, as a part of NASQAN.

South Central Alaska Region

- 1. The cooperative program with the U.S. Army Corps of Engineers to evaluate the proposed Watana and Devil's Canyon hydroelectric power sites was continued through 1979. Suspended-sediment data are being collected on a periodic basis at Susitna River near Denali, Alaska, and at Susitna River near Gold Creek, Alaska.
- 2. The cooperative program with the U.S. Forest Service was continued through 1979. Suspended-sediment data are being collected on a periodic basis at Dick Creek near Cordova, Alaska, and at West Fork Olsen Bay Creek near Cordova, Alaska. These data will be used to define the water quality on Forest Service lands.
- 3. A periodic suspended-sediment data co.lection program was initiated in October, in cooperation with the U.S. Army Corps of Engineers, on Katchamak Creek (entering Bradley Lake) near Homer, Alaska, and Bradley River (Bradley Lake outlet) near Homer, Alaska. There data are in support of a hydroelectric power study by the Corps and will be used in evaluating reservoir storage capacity and structure design.
- 4. A cooperative study was initiated with the U.S. Fish and Wildlife Service to describe the channel morphology, hydrology, sediment transport, and water quality of the Kenai River between Skilak Lake and the mouth. Daily suspended-sediment samples were collected from the Kenai River at Soldotna, Alaska, from August 29 through December 5, 1979.
- 5. Suspended-sediment data are being collected on a periodic basis at Talkeetna River near Talkeetna, Alaska, as part of the National Hydrologic Benchmark Network.
- 6. Suspended-sediment data are being collected on a periodic basis at Susitna River at Susitna Station, Alaska, and at Copper River near Chitina, Alaska, as a part of NASQAN.
- 7. Suspended-sediment data are being collected on a miscellaneous basis at the following sites:

Chuitna River near Tyonek, Alaska Skwentna River near Skwentna, Alaska

Southeast Alaska Subregion

1. As part of the cooperative program with the U.S. Forest Service, suspended-sediment data are being collected on a periodic basis at the following sites:

Kalinin Creek near Sitka, Alaska
Old Tom Creek near Kasaan, Alaska
Big Creek near Point Baker, Alaska
Perkins Creek near Ketchikan, Alaska
Rocky Pass Creek near Kake, Alaska
Zarembo Creek near Wrangell, Alaska
Zarembo Creek near Point Baker, Alaska
Navy Creek Outlet near Myers Chuck, Alaska
Municipal Watershed Creek near Petersburg, Alaska
Stephens Creek near Angoon, Alaska
Nicholas Creek near Angoon, Alaska
East Bradfield Creek near Wrangell, Alaska
Greens Creek near Juneau, Alaska

- 2. A cooperative study with the Alaska Department of Environmental Conservation on the hydrology and water quality of the Keta River basin near Ketchikan was continued in 1979. Suspended-sediment data are being collected at Keta River near Ketchikan, Alaska, and at White Creek near Ketchikan, Alaska.
- 3. Suspended-sediment data are being collected on a periodic basis at the Stikine River near Wrangell, Alaska, and at Skagway River at Skagway, Alaska, as a part of NASQAN.
- 4. Suspended-sediment data are being collected on a miscellaneous basis at Whipple Creek near Ward Cove, Alaska.

For additional information about Geological Survey activities within this region, contact the following office:

District Chief, WRD U.S. Geological Survey Skyline Building 218 East Street Anchorage, AK 99501

HAWAII REGION

GEOLOGICAL SURVEY

Hawaii Subregion

- 1. Monthly suspended-sediment data collection was discontinued at Wailuku River at Piihonua, Hawaii. The station was relocated 4 miles downstream as a part of the National Stream Quality Accounting Network (NASQAN).
- 2. Suspended-sediment data are being collected on a monthly basis at Honolii Stream near Papaikou, Hawaii, as a part of the National Hydrologic Benchmark Network.
- 3. Suspended-sediment data are being collected on a daily basis at one site in the Wailuku River basin, Hawaii, in cooperation with the U.S. Corps of Engineers. An automatic sampler was installed at the sampling site in Hilo. Data collection was disrupted in November 1979 during a tropical storm when record high water destroyed the gaging station.

Maui Subregion

1. Suspended-sediment data are being collected on a monthly basis at Kahakuloa Stream near Honokohau, Hawaii, as a part of NASQAN.

Molokai Subregion

1. Suspended-sediment data are being collected on a monthly basis at Halawa Stream near Halawa, Hawaii, as a part of NASQAN.

Oahu Subregion

- Suspended-sediment data are being collected at the following sites:
 - (a) Waikele and Kalihi Streams, Hawaii, as a part of NASQAN.
 - (b) Kipapa and Kalihi forest reserves, Hawaii, in cooperation with the U.S. Forest Service.
 - (c) Kamooalii Stream near Kaneohe, Hawaii, in cooperation with the U.S. Corps of Engineers.
 - (d) Moanalua Valley in cooperation with the State of Hawaii, Department of Land and Natural Resources.

Kauai Subregion

1. Suspended-sediment data are being collected on a monthly basis at Waimea River at Waimea, Hawaii, as a part of NASQAN.

For additional information about Geological Survey activities within this region, contact the following office:

District Chief, WRD U.S. Geological Survey P.O. Box 50166 300 Ala Moana Boulevard, Room 6110 Honolulu, HI 96850

CARIBBEAN REGION

GEOLOGICAL SURVEY

Puerto Rico Subregion

- 1. Suspended-sediment data are being collected on a bi-monthly basis at 48 sites in cooperation with the Puerto Rico Environmental Quality Board.
- 2. Suspended-sediment data are being collected on a monthly basis at the following sites as a part of NASQAN:

Río de la Plata at Toa Alta, P.R. Río Grande de Manatí near Manatí, P.R. Río Grande de Añasco near San Sebastian, P.R. Río Grande de Patillas near Patillas, P.R. Río Fajardo near Fajardo, P.R. Río Cerrillos near Ponce, P.R.

- 3. Suspended-sediment are being collected on a daily basis at Río Tanamá near Utuado, P.R., in cooperation with the Puerto Rico Environmental Quality Board.
- 4. Suspended-sediment are being collected on a daily basis at Río Cerrillos near Ponce, P.R., in cooperation with the U.S. Corps of Engineers.

For additional information about Geological Survey activities within this region, contact the following office:

District Chief, WRD U.S. Geological Survey P.O. Box 34168, Building 652 Ft. Buchanan, PR 00934

SOIL CONSERVATION SERVICE

- 1. Reservoir Sedimentation Survey
 - a. A sedimentation survey was conducted in November 1979, on Loiza Lake (Carraizo). Sediment accumulations have not yet been computed.

Water and Power Resources Service

Estimates of sediment deposition behind Guajataca Dam were made for existing and 2079 conditions. The estimated yield rate, using a yield vs. drainage area relationship developed for Northern and Central Puerto Rico from reservoir resurveys was 1,570 m /km² (3.29 acre-feet/mi²) per year. The estimated existing and 2079 deposition was 2,900 acre-feet and 8,600 acre-feet, respectively.

FOREIGN ACTIVITIES

Water and Power Resources Service

A letter from Mr. M. S. Pattihal of India inquired about standard particle sizes of sediment samples collected during sediment surveys in reservoirs. References were made to the AGU classification published by Mr. E. W. Lane in 1947, which has been adopted in sedimentation investigations in the United States.

Feasibility Design Data for Miramar Dam and Brito Entrance Channel Headwork Structures in Nicaragua were reviewed and changes in the report were recommended as follows: 1. The sediment density should be changed to 1.36 t/m^3 (84.8 lb/ft³); 2. For feasibility designs a sediment yield of 459 t/km^2 (1,310 tons/mi²) per year for the Brito River Basin should be used; 3. The estimated trap efficiency for Miramar Reservoir should be 45 percent according to 3 the Brune Procedure; 4. The 100-year volume of sediment is $4.65 \times 10^{6} \text{ m}^3$ (3,700 acre-feet). This gives a depth of sediment at the dam of 3.1 m (10.3 ft) or to an elevation of 10.1 m (33.3 ft); and 5. A stability as well as a sediment transport study are needed for the canal which connects Lake Nicaragua with Miramar Reservoir.

A presentation to a group of Agricultural Engineers from India included a series of slides showing the techniques used by the Water and Power Resources Service for excluding the coarser sand size material at diversion structures to canals.

Water surface profiles and degradation estimates were made downstream of Batu Damsite, Kuala Lumpur Flood Mitigation Project in Malaysia. An estimated degradation of 0.3 m (1.0 ft) downstream of the dam is considered small; therefore, no tailwater study based on degraded conditions is required.

A representative of the Water and Power Resources Service attended the United States - Pakistan Binational Symposium in Lahore, Pakistan. The symposium on the Mechanics of Alluvial Channels sponsored by the National Science Foundation consisted of presentations of many technical papers on many aspects of the data collection program on canals in Pakistan and Panel Discussions by participants on the present and future program in Pakistan. A field trip was made to the Mangla Dam and Tarbela Dam Projects to observe sediment and erosion problems especially at Tarbela Dam on the Indaus River.

LABORATORY AND OTHER RESEARCH ACTIVITIES

CORPS OF ENGINEERS

Coastal Engineering Research Center

DATA COLLECTION OF LITTORAL MATERIALS AND FORCES (LEO). The Littoral Environment Observation (LEO) program is a cooperative program carried out among Corps of Engineers District Offices, CERC, representative state agencies and volunteer observers. The present program involves the States of California, Michigan, Texas, Florida, Maryland, Oregon, Ohio, Georgia, Wisconsin, Washington, North Carolina, South Carolina, Pennsylvania, Massachusetts, and New York. In addition, LEO sites established under the Section 54 SEAP Program include the states of Washington, Alaska, Hawaii, Pennsylvania, California, Florida, Louisiana, Oregon, South Carolina, North Carolina, Ohio, Michigan and Wisconsin. The parameters measured daily are: breaker height, period, direction, type; longshore current velocities; wind speed and direction; foreshore slope; rip current spacing; beach cusp spacing and monthly sand samples.

Weekly profile measurements are made at the sites in New York. The LEO data is collected, collated and summarized for participating Corps Districts, state agencies and other volunteers. These data summaries show the climatology of surf, nearshore currents, coastal winds, beach geometry and sediment characteristics.

NUMERICAL MODELING OF COASTAL SYSTEMS. This study was initiated in 1976 to investigate the feasibility of developing a numerical model that would predict the response of a shoreline to changes in wave energy acting on it. Initial conclusions are that an approximate model suitable for use in planning studies can be developed that will provide estimates of the effects of various coastal structures on adjacent shorelines. A detailed literature survey of publications relating to mathematical prediction of shoreline evolution was published in 1977. (MR 77-10, "Mathematical Modeling of Shoreline Evolution" by B. LeMehaute and M. Soldate.)

Current efforts are being directed toward the development of a numerical computer model based on the equations of longshore sediment transport and the mass balance equation for the sediment. A paper describing the mathematical model was published in 1979 (M. Perlin, "Predicting Beach Planforms in the Lee of a Breakwater," Coastal Structures 79, proceedings published by the American Society of Civil Engineers, 1979). Several contract reports will be published in 1980 and 1981. The eventual product will be a computer program that will permit preconstruction estimates of the effects of proposed coastal structures, the interaction among several coastal structures along a shoreline and a method of estimating the damages attributable to the construction of a given navigation project.

WEIR JETTY ORIENTATION AND ELEVATION. A three phase study to investigate the functional and hydraulic behavior of weir jetty systems was initiated in late 1976. The research study includes two sets of laboratory experiments and a prototype data collection program.

A series of movable-bed laboratory tests will seek to quantify the distribution of sediment transport across a weir section for various wave conditions. A second series of tests using tracer material in a fixed bed model will attempt to determine relative volumes of sediment carried over the weir section and around the jetty and monitor the response of the updrift shoreline of a number of weir jetty systems to changes in wave direction. The prototype data collection program will measure the distribution of sediment transported across the weir sections of currently existing systems.

Expected output from this study will permit designers to use the empirical data to evaluate proposed weir jetty system designs and to establish OPTIMUM weir crest elevation, orientation and length.

PROTOTYPE EXPERIMENTAL GROIN, POINT MUGU, CALIFORNIA. The experimental and data collection phase of the study was completed 30 June 1976. All components of the permeable groin were removed by January 1977. The study is currently in the data analysis phase.

The final hydrographic survey and sediment samples were obtained in May 1976. Approximately 500 sand samples have been analyzed to determine mean particle size distribution and other statistical parameters. These parameters are being studied to determine their relationship to the longshore energy transport, foreshore beach slope and beach firmness.

This information will be included in the report on the functional performance of the experimental groin due to be published in 1980.

EVALUATION OF SHORE PROTECTION STRUCTURES. Analysis of the data from the North Carolina Beaches and the Texas Coast Inlet Study is currently in progress, the former under contract and the latter in-house. A CETA relating sea-level rise to erosion rates was completed and published in May 1979. The final draft of a report entitled "Guidelines for the Design of Weir Jetty Sand By-passing System" has been completed and is being reviewed. Monitoring programs have been initiated at Lakeview Park, OH (Offshore Breakwaters), Murrels Inlet, SC (Weir Jetty System), and Little River Inlet, SC (Weir Jetty System). Monitoring plans will be developed for Tybee Island, GA (A proposal groin with weir section) and Presque Isle, PA (Series of Detached Breakwaters). Data sheets for evaluating low cost shore protection in the field are being developed to result in a loose leaf notebook on the structural characteristics and performance of various low cost shore protection schemes.

SEDIMENTATION IN HIGH TIDE RANGE AREAS. Objectives of this study are to develop methods to predict the degree of shoaling that might be expected in a prototype harbor basin in Alaskan waters or other high tide range areas, and to develop a means of minimizing shoaling. Emphasis in 1979 was on report writing. Two reports were completed:

- 1. Everts, Craig H. "A Method to Forecast Sedimentation Rates Resulting From the Settlement of Suspended Solids Within Enclosed Harbors", CERC publication expected in 1980.
- 2. Everts, Craig H., "A Method to Predict the Stable Geometry of a Channel Connecting an Enclosed Harbor and Navigable Waters", CERC publication expected in 1980.

and one was prepared for presentation to the 17th Coastal Engineering Conference:

Everts, Craig H., "Design of Enclosed Harbors to Reduce Sedimentation", to be published in Conference proceedings.

CURRITUCK SAND BYPASS TEST. The split-hull dredge CURRITUCK has the capability to excavate sediment from shallow coastal inlet entrance channels and transfer that sediment to shallow nearshore areas adjacent to the inlets. The purposes of the CURRITUCK study were to monitor the movement of dredged material placed in the nearshore zone; to determine its response to littoral processes; and to evaluate the shallow water placement technique for beach restoration application.

Phase I of the study was a 1976 field effort to monitor the movement of 35,000 yd³ (27,000m³) of sand placed as a single mound in minimum water depths of 8 feet near New River Inlet, NC. The major finding was that most of the sand moved rapidly landward into the surf zone. The success was incomplete, though, in that most of the dumped sand, once it reached the surf zone, was carried in an alongshore direction rather than onshore to restore the adjacent beach. The net volume of sand in the total littoral system, however, was increased.

Following completion of Phase I, a Phase II field operation was initiated at the same field site during the summer of 1978 to examine the movement of sand placed in several mounds at different water depths. If a timely shoreward movement of sand continued to result with the deeper water placement technique, the cost efficiency of the disposal operation could be significantly increased.

The twelve-month Phase II field study was conducted during the summer and fall of 1978 and the winter and spring of 1979. A total of $53,000~\text{yd}^3$ of sand was placed as three separate mounds in water depths of 8 ft, 10 ft, and 12 ft. Time-sequence profile data (CRAB surveys), sediment

samples and wave and current date were collected. An examination of the data set indicates that the shallowest mound responded similarily to that of Phase I. Although sand movement occurred on the deeper-water mounds, the transport effects were much less. Analysis of data from the twelve-month field effort has been done and it is anticipated the report will be prepared in 1980.

An initial report on Phase I was published in 1977(ASCE Sediment '77, "Nearshore Disposal: Onshore Sediment Transport," by R.K. Schwartz and F.R. Musialowski) and a more extensive final report is being published by CERC. An interim report on Phase IV was finalized in May 1979.

EVOLUATION). Long-term changes in the water elevation on the Great Lakes are cyclic, but unpredictable. As the weather varies there are periods of rising water levels which last for several years followed by similar periods of falling levels. After reaching a 115-year record low in 1964, the annual mean surface elevation of Lake Michigan rose steadily to an 86-year record high in 1973. Beach profile sites initially established by the Lake Survey (USCEC) in 1967 on the east shore of Lake Michigan were resurveyed in 1969, 1971, 1975, and 1976 to gain insight into beach and nearshore bathymetric changes which accompanied this long term rise in lake levels.

Comparison of short-term profile changes (days to months) with the net change over a number of years, indicated that storm and seasonal effects were overshadowed by the gradual, cumulative adjustment of the profile. Between 1967 and 1971 the annual mean elevation of Lake Michigan rose 0.5 meters. In the restricted area where profiles dated back in 1967, most of the inner three longshore bars also rose 0.5 meters in elevation and migrated 26 meters landward. The shoreline retreated an average of only 13 meters during this period. Roughly one half of this retreat was attributable to simple submergence as the lake rose; the other half represented recession due to actual erosion. A report summarizing bar characteristics and profile changes between 1967 and 1971 was published, (TR-76-1), "Observations of Barred Coastal Profiles Under the Influence of Rising Water Levels, Eastern Lake Michigan, 1967-71," by E.B. Hands.

In a cooperative program with NOAA the profile sites were resurveyed in 1975. Results showed that the rate of shore retreat remain well above the historic average even though the water level had reached its peak two years earlier. A presentation on the effect of submergence on shore erosion rates was made before the 2d International Symposium on Land Subsidence, December 1976. ("Some Data Points on Eroison and Flooding for Subsiding Coastal Region," by E.B. Hands).

The study was resurveyed in 1976 to test, among other things, if recession was still continuing. At most stations the recession had slowed and some accretion had isolated the formerly receding dune face

from continued wave erosion. The net erosion measured over the three years since the water levels peaked had caused the shore to recede to a position in good agreement with that which had been predicted in CERC TR 76-1 as necessary to bring the profile back in equilibrium. Erosive recession now accounted for 80% of the total shore retreat. A presentation on the impact of coastal subsidence was made at the ASCE Sediments Symposium (November 1977) based on the 1967 to 1975 profile measurements together with data on changes in historic shoreline position elsewhere around Lake Michigan. ("Implications of Submergence for Coastal Engineers," E.B. Hands).

In 1978 two CERC reprints based on this work unit were distributed (reprints 78-7 and 78-11). A report was prepared summarizing all shoreline changes from 1967 to 1976 and recommending a simple procedure for estimating future shore retreat under similar situations.

In 1979 the aformentioned report received CERC, NCD, and non-Corps review; and was revised and edited for CERC publication. A final report on this work unit was prepared summarizing not just nearshore but offshore bathymetric changes. Offshore desposition balanced nearshore erosion. The effects of the two processes was to shift the entire active profile inland and upward. The outer depth of profile adjustment was related to local wave climate. Geographic variations in the depth of adjustment were calculated using WES hindcast wave statistics. The final report concludes with a method for predicting the ultimate profile adjustment to any change in mean lake level and for all sandy reaches on the U.S. side of the Great Lakes.

BEACH FILL SEDIMENT CRITERIA

- 1. <u>Guidelines for the Design of Beach Fills</u>. Guidance for fill specification, prediction of fill performance, borrow source and beach sampling, and granulometric description of sediments are provided by (1) CERC TM 60 "Techniques in Evaluating Suitability of Borrow Material for Beach Nourishment" by James, (2) CERC TP 77-6 "Review of Design Elements for Beachfill Evaluation" by Hobson and, (3) CERC CETA 79-7 "Meeting and Use of Phi Grade Scale" by Hobson.
- 2. Monitoring Beach Fill Performance. The first field monitoring study to test proposed beachfill models was completed at Imperial Beach, CA, and analysis of those data is nearing completion. Monitoring of the fill project at Surfside/Sunset Beach, CA was begun and a third monitoring site will be selected soon. These long-term projects will provide data for field validation and modification, if necessary, of the Renourishment and Fill Factor models presented in the Shore Protection Manual.
- 3. Evaluation of Potential Nearshore Borrow Sources. Offshore sand bodies may become a important future source for beach fill sediment. Ebb tidal delta complexes are commonly found along the East Coast and one

such delta at New River, NC, was core sampled and surveyed to generally assess its fill potential. Results from this study and from additional studies to be carried out at other "typical" sand bodies will provide a basis for generally evaluating the fill potential of these kinds of sand resources.

- 4. <u>Handling Loss Experiments</u>. Three experiments were conducted in North Carolina and New York to evaluate modifications to sediment texture caused by dredging and handling operations. Results from these experiments reported by R.D. Hobson at three engineering conference were that winnowing losses generally improved the predicted performance of dredged sediments as beach fill, and that a mathematical model shows promise which estimates potential handling losses by comparing textural attributes of sedimentary materials.
- 5. Other Ongoing Studies. Core sampling studies across the active profile are providing the depth component of beach sediment textural variability for use in improving beach sampling guidelines. Also, the analysis of sediments core-sampled from a sand trap feature at Channel Islands, CA, will provide data to estimate the winnowing function of the renourishment beach fill model, to document the textural filling history of the sand trap, and will serve as a basis for evaluating the relative merits of core sampling versus surface sampling of nearshore sediments.

COASTAL SEDIMENTS. Analyses and interpretation of seismic records and sediment cores from the Atlantic Coast, Gulf Coast and Great Lakes continued through 1979. In addition 300 trackline miles of seismic reflection and side-scan sonar data were collected off the coast of southern California from Oceanside Harbor to the Mexico border. Data is now being analyzed for the purpose of selecting core sites for cores to be collected in the summer of 1980.

- 1. Reports published during the report period together with major conclusions and applications follow:
- a. Meisburger, E.P., "Reconnaissance Geology of the Inner Continental Shelf, Cape Fear Region, North Carolina", T.P. 79-3, U.S. Army Corps of Engineers, Coastal Engineering Research Center, Ft. Belvoir, Va., Sept. 1979. This report contains data on the surficial and shallow subsurface sediments and rocks which are applicable to the planning, design and construction of engineering works on the inner shelf and to studies of sediments sources and movement in the coastal and inner shelf zones.
- b. Meisburger, E.P., Williams, S.J. and Prins, D.A., "Sand Resources of Southern Lake Michigan", M.P. 79-3, U.S. Army Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, VA, July 1979. This report contains information concerning the general location and configuration of sand deposits off the eastern shore of Lake Michigan and their suitability for use in beach restoration projects. It can be utilized to determine the location and general character of sand deposits for planning beach restoration projects.

- c. Williams, S.J., Prins, D.A. and Meisburger, E.P., "Sediment Distribution, Sand Resources and Geologic Character of the Inner Continental Shelf off Galveston County, Texas", M.P. 79-4, U.S. Army Corps of Engineers, Coastal Engineering Research Center, Fort Belvoir, Va., July 1979. This report contains data on the location and general character of sand deposits on the inner shelf and their suitability for use in restoration and nourishment of local beaches. In addition information is given on the shallow stratigraphic framework of the inner shelf and the character of surficial and subsurface geologic units. The study can be used for the planning, design and construction of beach restoration projects and the development of engineering works in or affecting inner shelf waters.
- d. Field, Michael, E., "Sediments, Shallow Subbottom Structure, and Sand Resources of the Inner Continental Shelf, Central Delmarva Peninsula", T.P. 79-2, U.S. Army Corps of Engineers, Coastal Engineer Research Center, Fort Belvoir, Va., June 1979. This report contains information on the shallow geologic framework of the inner shelf and the location and general character of sand deposits usable for beach restoration and nourishment on the adjacent coast. It is applicable to planning and design of beach restoration projects and engineering works on the inner shelf.
- e. William, S.J., "Geologic Effects of Ocean Dumping on the New York Bight Inner Shelf", Reprint 79-1, from Palmer, H.D. and Gross, M.G. ed. "Ocean Dumping and Marine Pollution," Dowden, Hutchinson and Ross, Inc., Stroudsburg, Penn., 1979.
- f. Field, M.E., Meisburger, E.P., Stanley, E.A. and William, S.J., "Upper Quaternary Peat Deposits on the Atlantic Inner Shelf of the United States", Reprint 79-7, from Bulletin of the Geological Society of America, Vol.90, pp. 618-628, July, 1979.
- 2. The following reports are in draft form and being reviewed for publication:
- a. Sand Resources and Regional Geology off the South Shore of Lake Erie Conneaut, Ohio to Erie, Pennsylvania.
- b. Sand Resources off the South Shore of Lake Erie, Conneaut, Ohio to Toledo, Ohio.
- c. Regional Geology of the Lake Floor of Lake Erie from Conneaut, Ohio to Toledo, Ohio.
 - d. Data Collection Methods for Sand Inventory Type Surveys.
 - e. Sand Resources of the Cape May Region, New Jersey.
- 3. The following in-house reports were in work prior to the end of 1979:

- a. Sand Resources of the Egg Harbor Barnegat Area, New Jersey.
- b. Sand Resources and Regional Geology of Long Island Sound.
- 4. The following papers completed in 1979 have been accepted for publication by journals and will be published in 1980:
- a. Meisburger, E.P., "A Cretaceous Tertiary Depositional Sequence in the Submerged Coastal Plain off North Carolina", Southeastern Geology, in press.
- b. Meisburger, E.P., Williams, S.J., and Prins, D.A., "An Apparatus for Cutting Core Liners". Journal of Sedimentary Petrology, in press.

STORM EROSION STUDIES. The purpose of this study is to develop methods for predicting storm-induced beach changes. During the first phase of the study (to be completed in FY 80), measured beach changes will be empirically related to storm parameters. Available data include storm change surveys conducted by this study between November 1975 and March 1978 and similar data collected under CERC's Beach Profiling Program between 1962 and 1977. Attempts were made to isolate storm effects by surveying just before and just after major storms.

Some of the best data obtained were collected during the winter of 1977-1978 when three major northest storms occured. Data are collected at three locations: Long Beach Island and Ludlam Island, New Jersey, and Bodie Island, North Carolina (near CERC's Field Research Facility).

Dramatic changes occured during these storms with frequent lowland flooding and extensive dune erosion. A paper discussing the best monitored storm, which occured 19 December 1977, was published in the January 1979 issue of Shore and Beach.

During the second phase of the study, to begin in FY 80, a numerical model of nearshore sand movement will be developed, calibrated, and verified using data collected at CERC's FRF. This is a major effort aimed at understanding and predicting the physical processes which caused storm erosion.

BEACH PROFILE STUDIES. The objectives of these studies are to observe the response of beaches to waves and tides of specific intensity and duration and to develop predictive techniques for estimating seasonal and storm-induced beach changes.

During the 1979 calendar year emphasis continued on the preparation of locality reports summarizing data collected since 1962.

The report "Beach Changes at Westhampton Beach, New York, 1962-73" by A.E. DeWall was published as CERC MR 79-5. This report documents the temporal and spatial changes along 20 profile lines at Westhampton Beach. These data show that shoreline erosion rates of 2 to 3 meters per

year within and updrift of a large groin field were reversed after groin construction, while shoreline erosion immediately downdrift of the groin field increased. Profile lines updrift of the groin field accreted at a rate of 1 meter per year, as measured at the MSL shoreline. Profile lines with the groin field accreted at a rate of 3 meters per year, while a profile line downdrift eroded at a rate of 28 meters per year.

A final draft report "Beach and Inlet Changes at Ludlam Beach, New Jersey," by C.H. Everts, A.E. DeWall, and M.T. Czerniak, was submitted for CERC publication. Survey data collected along 20 profile lines indicate a net shoreline erosion rate of 1.6 meters per year.

A final draft report "Beach Changes at Atlantic City, New Jersey, 1962-1973," by D.P. McCann was submitted for CERC publication. This report documents profile changes along the northeastern half of Absecon Island and includes the effects of two beach nourishment projects. The net shoreline change along 7 profile lines was an accretion of 0.73 meters per year. Beach fill placed on the northeastern end of the island effectively nourished downdrift beaches for up to 5 years.

A final draft report "Effect of Structures and Lake Level of Bluff and Shore Erosion in Berrien County, Michigan," by W.A. Birkemeier was submitted for CERC publication. This report documents bluff recession rates averaging 3.8 meters per year and shoreline erosion rates averaging 3.1 meters per year along the eastern shore of Lake Michigan between 1970 and 1974.

A final draft report "Beach Profile Analysis System" by M.V. Fleming and A.E. DeWall documents a package of computer programs for editing, analyzing and displaying beach profile data.

In a cooperative study with the Navy Civil Engineering Laboratory, an inventory of available repetitive nearshore profile surveys was made to determine and ultimately predict, the magnitude and location of maximum sandlevel fluctuation that occurs over less than a 2-year interval. A total of 33 data sets (1,049 profiles) representing eight coastal localities was used in the analysis. The zone of maximum sand level fluctuation was found to extend from the berm to a median depth that is approximated by the annual extreme wave height (conditions exceeded for 12 hours per year). At the most exposed of the sites - Duck, North Carolina - a maximum sand level change of 4.0 meters was observed 90 meters seaward of the average shoreline position.

LIMITING WATER DEPTH TO SAND BEACH EROSION BY WAVES. A review of available laboratory measurements has resulted in a paper by Robert Hallermeire, "Criteria for Sand Motion Initiation by Water Waves," presently being considered for ASCE publication. The new calculation procedure for predicting sand motion corrects and simplifies the Shields criterion from steady flow in certain respects. Further research still to be reported, has found that the calculated maximum water depth for

sand motion is directly related to a certain seaward limit of profile modification in the available data base of laboratory tests on profile development towards equilibrium.

WAVE-SEDIMENT INTERACTION STUDIES IN A WATER TUNNEL. For a CERC-sponsored study, Karl Lofquist of the National Bureau of Standards has developed an apparatus for measuring wave energy loss due to natural sand beds. The sinusoidal-flow water tunnel has been partitioned into two channels, one with smooth rigid walls and the other with a horizontal sand bed; measurements of differential pressure between the two channels are analyzed to determine the stree coefficient due to the sand bed through the flow cycle. Lofquist will present first results from the ongoing experimental program in March 1980, at the 17th International Conference in Coastal Engineering in Sydney, Australia.

LONGSHORE TRANSPORT. A report is being written summarizing fifteen experiments relating wave conditions to longshore transport rate performed in the Shore Processes Test Basin, at generator angles of 0, 10, 20, and 30 degrees. Measurements include hourly values of wave breaker angle, wave height, and longshore current, and four-hourly values of transport rate. The data show considerable variability in all measured quantities that does not appear to have been reported in previous tests, probably because data were not previously measured so systematically. Initial results are similar to past laboratory tests.

SUSPENDED SEDIMENT - COMPARISON OF CONCENTRATION MEASUREMENTS OBTAINED WITH THREE FIELD-PROVEN METHODS. Experiments were conducted in the Large Wave Tank at CERC during September 1979 to permit comparison of suspended sediment concentrations measured with 3 devices: an in situ bulk sampler, developed by Timothy Kana at the University of South Carolina; a 3mHz acoustic sensor, developed by John Proni at the Atlantic Oceanographical and Meterological laboratories, NOAA; and a pump sampler, similar to that used in the field by John Fairchild of CERC. The tests had unbroken waves up to 1.5-meter high in 4 meter water depth over fine and medium quartz sand beds. A report being written will compare the ratios of sediment concentration at several elevations determined using the three devices.

LITTORAL TRANSPORT TESTING PROCEDURES. The purpose of this work unit is to improve the understanding and operation of coastal engineering laboratory experiments and models.

During 1979 preliminary work on a manual for the design and operation of movable coastal engineering laboratory experiments was stated.

CORPS OF ENGINEERS

The Hydrologic Engineering Center

Work at the Hydrologic Engineering Center (HEC) continued to focus on improvements to the mathematical model HEC-6, "Scour and Deposition in Rivers and Reservoirs." The two major accomplishments were:

- 1. Development of the capability to simulate gravel mining operation. The program was modified to recognize removal of user specified volumes of material from the stream bed. The volumes are specified as rates of removal at given locations for given durations. This volumetric change is included with the calculated changes due to material entering the reach from upstream, and changes in transport capacity and bed material gradation to calculate net changes in transport rate, bed elevation, and bed material gradation.
- 2. A graphics display package was developed for the program. This package allows the user to view plots of cross-sections, bed profiles, and changes in bed profiles due to scour and depostion, and bed material grain size distributions.

Additional work was done to develop an explicit coupling between a two-dimensional hydrodynamic model (RMA-2) and a two-dimensional sediment transport model (STUDH). The objective of the work was to develop capability for simulating horizontal flow systems, such as occur in some estuaries, in which the scour or deposition of bed sediments modifies the bed topography enough to significantly change the flow field.

CORPS OF ENGINEERS

Waterways Experiment Station

Title of Study:

Definition of Cause of Navigation Channel Shoaling

Conducted by:

U.S. Army Engineer Waterways Experiment Station

Conducted for:

Office, Chief of Engineers

Summary of Accomplishments:

The Definition of Cause of Navigation Channel Shoaling study was a portion of the Improvement of Operations and Maintenance Techniques (IOMT) program during FY 78 and was transferred to the Coastal Engineering program for FY 79. It is funded by the Office, Chief of Engineers.

The objective of this research is to develop a coherent approach for the solution of estuarine navigation channel shoaling problems. This will be accomplished by classifying estuaring shoaling problems and showing how these problems should be solved, detailing step-by-step procedures. Areas requiring further research will be identified. Thus far, the major area of investigation has been literature surveys to isolate available information on the processes causing significant shoaling in navigation channels and ongoing research. A detailed review of pertinent literature on 43 Corps projects was also initiated to determine characteristics and magnitude of dredging at these sites. The following have been defined as subtasks of this study:

- 1. Evaluation and extent of shoaling problem--nationwide.
- Survey and evaluation of shoaling volume determination.
 - 3. Hydraulic research on causes of navigation shoaling.
- 4. Research on prediction of sediment transport, deposition, erosion, and resuspension.
 - 5. Research on techniques to reduce shoaling cost.
 - 6. Data management.

The objective of each of these subtasks has been formulated. Information derived from these subtasks would be used to generate an instructional report which would describe how to approach and solve navigation channel sedimentation problems. Thus, during FY 78 (our first year), we assembled the available information in a manner which will eventually allow it to be applied to reduce maintenance dredging.

During FY 79, a detailed outline of a report was prepared on the six subtasks of the project, field studies were formulated for various Corps projects, areas where research is needed were identified, all literature reviews previously completed were updated, and the planning phase for an instructional report for field offices to use in solving shoaling problems was initiated.

In the future, a report describing the state of knowledge of shoaling processes incorporating information from reports of the six study subtasks will be prepared. A research plan addressing needs identified in the report will be formulated. A report will be published describing how to approach and solve navigation channel sedimentation problems using existing field data. Results will be used to revise EM 1110-2-1607, Tidal Hydraulics, and contribute to a new EM on Channel Design.

Title of Study:

Effect of Depth and Width on Dredging Frequency

Conducted by:

U.S. Army Engineer Waterways Experiment Station

Conducted for:

Office, Chief of Engineers

Summary of Accomplishments:

The Effect of Depth and Width on Dredging Frequency study is a portion of the Improvement of Operations and Maintenance Techniques (IOMT) program, funded by the Office, Chief of Engineers. The objective of the project is to evaluate the effectiveness of advance maintenance dredging in reducing frequency and costs in coastal and inland channel and harbor maintenance and to establish guidelines necessary for governing this practice. Thus far, the major area of investigation has been literature and Corps of Engineers districts surveys and the evaluation of advance maintenance dredging projects. An empirical technique based on historical dredging records has been developed to predict the effect of depth and width on dredging frequency and volume. Specific projects have been evaluated by detailed analysis of hydrographic surveys to determire the effect of advance maintenance on both frequency and amount of dredging required. A trend analysis of a large number of dredging projects using historical dredging data has been conducted to investigate the effect of channel enlargement on shoaling rates.

Accomplishments during Calendar year 1979 include the following:

- 1. A report (Report 2) describing the methods now being used to predict the effect of deepened conditions on shoaling in a dredged navigation channel and presenting a rational, empirical approach to the problem based on historical dredging and shoaling data was in the final stages of publication.
- 2. Evaluation of historical dredging data for specific sites in the Galveston, Charleston, Portland, and Seattle Districts has been conducted. Preparation of a draft report was underway.
- 3. A study to attempt to classify several project according to how they have behave historically with deepening is underway.

Future work will include continued evaluation of existing advance maintenance dredging projects. The final objective of the study is to publish a series of technical reports which (1) describe current advance maintenance criteria and identify previous and current projects; (2)

describe an empirical technique, based on historical dredging records, to predict the effect of depth and width on dredging frequency and volume; (3) evaluated the shoaling results from existing advance maintenance projects; and (4) classify Corps' dredging projects with regard to advance maintenance effectiveness.

Title of Study:

Offshore Dredging Systems

Conducted by:

U.S. Army Engineer Waterways Experiment Station

Conducted for:

Office, Chief of Engineers

Summary of Accomplishments:

The Offshore Dredging Systems project is a portion of the Improvement of Operations and Maintenance Techniques (IOMT) program, funded by the Office, Chief of Engineers. The objective of the project is to develop new techniques, procedures, and equipment that will open new supply sources of beach nourishment materials and permit economic exploitation of these resources with a minimum disturbance of ecosystems.

Accomplishments during Calendar Year 1979 include development of criteria for the selection and engineering development of nourishment systems suitable for the example projects defined under this work unit.

Future efforts will include the initiation of contracts to perform nourishment system engineering development.

Title of Study:

Eductor Systems for Sandtrap Bypassing

Conducted by:

U.S. Army Engineer Waterways Experiment Station

Conducted for:

Office, Chief of Engineers

Summary of Accomplishments:

The purpose of this study is to develop effective systems for bypassing sand at tidal inlets and other obstructions to littoral transport, including dredged channels, jetties with and without weir sections and deposition basins, and breakwaters. Laboratory and field tests were required for development and evaluation of equipment and operating techniques.

A short series of laboratory tests was conducted with various fluidizer configurations. These tests were inconclusive and continuation was not considered due to the expiration of project funding.

Report preparation continued during Calendar Year 1979. The instruction manual to assist Corps districts in planning bypassing projects using eductor systems was completed in Calendar Year 1979 and will be published in Calendar Year 1980.

Title of Study:

Section 32 Program, Streambank Erosion Control (The Streambank Erosion Control and Demonstration Act of 1974-Public Law 93-251, Section 32, as amended by Public Law 94-587, Section 155 and 161).

Conducted by:

U.S. Army Engineer Waterways Experiment Station

Conducted for:

Office, Chief of Engineers

Summary of Accomplishments:

The legislatively specified objectives of the "Section 32 Program" consist of (1) an evaluation of the extent of streambank erosion on navigable rivers and their tributaries; (2) development of new methods and techniques for bank protection, reseach on soil stability, and identification of the causes of erosion; (3) a report to the Congress on the results of such studies and recommendations of the Secretary of the Army on means for the prevention and correction of streambank erosion; and (4) demonstration projects, including bank protection works.

Three flumes are being used to conduct channel flow tests, wave tests and innovative protection tests. Model tests on several streambank protection types have been continued and additional results published in a fourth brief research report. The tenth field inspection of existing bank protection was made and results of the sixth were published and distribution to OCE, Division, and Districts. During CY 79 construction of a 1:20-scale tow and channel for testing the effects of navigation on bank protection was completed. Tests were made to evaluate the effects of rapid drawdown on various protection techniques. Demonstrative and comparative testing of several protection techniques including a concept used in Australia were conducted in the alluvial channel flow model flume.

Significant results obtained in shear stress tests indicated high sensitivity to several factors. Analyses and reporting of geologic and geomorphic investigations of specific sites gave emphasis to the need for such studies in designing effective bank protection. Results of tests on panels, membranes, and spray-on materials were published for field use and several specific schemes were installed on a streambank at WES.

Work in Progress:

Hydraulic research will be continued to evaluate the effectiveness of various streambank protection methods and materials to withstand wave attack, flow, rapid drawdown, and navigation effects. Field inspection and monitoring of existing and Section 32 Program—constructed demonstration sites of streambank protection will be continued and reported.

Work will continue on developing a procedure for streambank stability analysis which includes laboratory measurements of erosion rate and strength properties of undisturbed soils. A laboratory test flume will be completed and calibrated. Analysis of waterborne geophysical data will be concluded. Draft reports will be prepared on waterborne geophysical applications, results of Yazoo Basin studies, and a summary of findings. Test items installed on a creek at WES will be monitored. Seven test items will be installed and evaluated on the Big Black River. Physical testing and evaluation of experimental items used on streambank erosion test sites will be conducted in the laboratory.

Title of Study:

Predictive Models of Sediment Movement

Conducted by:

U.S. Army Engineer Waterways Experiment Station

Conducted for:

Office, Chief of Engineers

Summary of Accomplishments:

Under the research project, Improvement of Operational and Maintenance Techniques, two major advances were made in numerical sediment transport modeling. The HEC-6 computer code was enhanced to automatically attenuate the flood wave, to automatically modify cross sections by simulating overbank fills and/or in channel dike fields, and by printing out additional parameters. Development of a new computer code was initiated. It will calculate unsteady, sediment transport in a two-dimensional flow field. The horizontal plane is being treated first; later the vertical plane will be included.

Experimental work on the deposition of clay was initiated in the 335 foot long flume. Commercial Kaolinite will be studied, first, in this nonrecirculating facility.

Work was initiated on revising the CE manual on sedimentation. This project is designed for a five-year effort during which CE expertise in sedimentation will be collected and documented along with work of other government agencies, universities, and the private sector.

Title of Study:

Characterization of the Suspended-Sediment Regime and Bed-Material Gradation of the Mississippi River Basin.

Conducted by:

U.S. Army Engineer District, New Orleans

Summary of Accomplishments:

A report on this effort is scheduled for publication in late FY 80. Appendixes B through F of this report contain characterizations of the suspended-sediment regime and bed-material gradations of the following regions: Missouri, Upper Mississippi, Ohio, Tennessee, Arkansas-White-Red, and Lower Mississippi. The introduction to each appendix includes narrative material describing the physiography, geology, climatology, hydrology, vegetation, exploration and settlement, and land-use development of the region. Sections are also included that discuss the origin of sediments in each region, cultural influences on the suspended-sediment and bed-material loads, the history of suspended-sediment and bed-material sample collection, and long-term trends in the suspended-sediment regime and bed-material gradation.

The effort is part of Study Area IV, Sedimentation, of the Lower Mississippi Valley Division P-1 Potomology Program.

CORPS OF ENGINEERS

Federal Inter-Agency Sedimentation Project
St. Anthony Falls Hydraulic Laboratory
University of Minnesota
Minneapolis, Minnesota

Annual project report for Calendar Year 1978 is described below.

Laboratory Research, Work is Progress - Testing full size bedload samplers in the modified large indoor flume at the St. Anthony Falls Hydraulic Laboratory was continued through 1979. In cooperation with David Hubbell and Herbert Stevens the group has now tested six different styles of Helley-Smith bedload samplers, through a range of flow depths and velocities and with both 6.5mm and 2mm bed material.

The D-77 sediment sampler discussed last year was modified in accordance with results of field tests. To reduce drag, stock was removed from the lower front region, then the sampler was rebalanced by removing stock from the downstream end of the casting. The new sampler will be shipped complete with a permanent container, a lifting tool, a special wrench, and operating instructions.

The DH-75Q sediment sampler was redesigned to accommodate a greater variety of bottles and to improve stability. The changes involve a redesigned stopper and moving the wading rod attachment closer to the nozzle of the sampler. The DH-75 samplers are lightweight units designed for use in sub-freezing temperatures.

Production of the RP-77, low-power peristaltic pump designed by the project, was started this year. The pump was primarily designed for the PS-69 and CS-77 pumping samplers, but will be used on other development projects. In its present form the pump may be powered from a 36-volt battery but a 12-volt model will be available soon.

At the request of participating agencies, the group built, tested, and is improving a hand-operated clam-shell bed-material sampler suggested by James Culbertson.

Plans for the coming year include development of a bag-type sampler and a density cell for automatic measurement of sediment concentration.

Equipment Supply - Supply, repair, and calibration of a variety of sediment samplers and analyzers was continued. A catalog and detailed equipment manuals are available upon request. During 1979, sales and inventory were as follows:

				Inven-
		Sold	Sold	tory
		since	during	Dec.
Instrument		1940	1979	1979
DH-48	Hand sampler	2910	353	122
DH-75P	Hand sampler	99	7	0
DH-75Q	Hand sampler	108	19	16
DH-59	Hand-line sediment sampler	1131	139	30
DH-76	Hand-line sediment sampler	235	130	0
D-49	Depth-integrating sampler	900	0	0
D-74	Depth-integrating sampler	275	77	29
D-74AL	Depth-integrating sampler	106	5	23
P-61	Point-integrating sampler	218	13	2
P-63	Point-integrating sampler	39	2	5
P-72	Point-integrating sampler	30	6	10
BMH-53	Bed-material hand sampler	325	42	17
BMH-60	Bed-material hand sampler	235	37	8
BM-54	Bed-material sampler	179	6	22
SA	Particle-size analyzer	85	2	0
PS-67	Pumping sampler	42	0	0
PS-69	Pumping sampler	320	22	24
CS-77	Chickasha pumping sampler	35	19	4
SS-72	Sample splitter	33	1	3
BP-76	Power supply	112	23	12

FEDERAL HIGHWAY ADMINISTRATION

The Federal Highway Administration (FHWA) concentrated its activities on five major areas: control of culvert outlet erosion, control of local scour around bridge piers, control of stream instability at highway crossings, control of sediment produced by highway construction, and control of highway water quality. Major efforts were carried out by staff and contract research, and by the various studies in the Highway Planning and Research Program (HP&R) and in the National Cooperative Highway Research Program (NCHRP).

<u>Control of Culvert Outlet Erosion</u> - The objectives of these studies are to investigate the various flow conditions and the forces involved at the outlet area, the material necessary to resist the erosion, and the special designs of energy dissipators and stilling basins to control the erosion.

- A. Sponsored by FHWA, the U.S. Geological Survey Hydroscience Center at Bay St. Louis, Mississippi, conducted the energy dissipator study titled, "Investigation of Rigid Boundry Basins in Flared Outlets from Circular Culverts." This study yielded basin drag coefficients for serrated roughness elements in flared transition sections at culvert outlets. FHWA will incorporate the research results into its Hydraulic Engineering Circular No. 14.
- B. The University of Akron completed the study, sponsored under the H7&R program by the Ohio Department of Transportation (ODOT), on "Field and Laboratory Evaluation of Energy Dissipators for Culvert and Storm Drain Outlets." This study is directed toward two dissipator concepts that can be precast for culvert installations that do not require field concrete work. One is the modular basin which can be precast in components and assembled in the field by a maintenance crew; the other is the concrete pipe roughness ring which can also be precast and bolted into regular culvert sections. Another important aspect for this study is the evaluation of the ODOT procedures for providing channel protection for culvert outlets that do not require dissipators. The evaluation focuses on the so-called "Cincinnati Method" for designing rip-rap protection and will involve some 400 field sites. Draft final reports for these aspects of the study were submitted in 1979. The final reports will be published in 1980.
- C. Colorado State University is conducting a study, sponsored by FHWA, to investigate scour at culvert outlets in various bed materials. The study includes four bed materials; a uniform sand, a uniform gravel, a sand-gravel mixture, and a sand-silt-clay mixture. The study includes tests with various culvert diameters ranging from 4 to 15 inches to test the adequacy of modeling assumptions in developing design guidelines for much larger field installations. Most of the original tests were completed in 1979. The study will be modified for additional tests to determine the effects of tailwater and to strengthen the relationship for part full culvert flow.

<u>Control of Local Scour Around Bridge Piers</u> - The objectives of these studies are to investigate the mechanics of this dynamic process, the methods of accurate prediction of its magnitude, the adequate means of controlling its damaging effect to bridge piers, and the stream-related hazards to highways and bridges.

- A. The contract study on the Study of Scour Around Bridge Piers was completed by West Virginia University. The objectives of this study were to collect parameters which influence scour depth around bridge piers on rivers with noncohesive soils, and to test existing methods and/or to provide an improved method for predicting the scour depth. The researchers experimented with instrumentation and monitored three bridge sites in the mid-continent--Shreveport (Louisiana), Homochitto (Mississippi), and Richmond (Texas)--for approximately 5 years. The portable, truck-mounted scour monitor was found very helpful as backup to the fixed monitors which had been used previously. The final report titled "Scour Around Bridge Piers," FHWA-RD-79-103, is being printed; it will be available through NTIS.
- B. The University of Iowa completed a FHWA study on Scour Around Bridge Piers at High Froude Numbers. This study is a selective investigation to determine trends of scour under flow conditions that exceed the conditions of most of the previous tests. The investigation included scour in three sizes of cohesionless bed materials at Froude Numbers that range from 0.5 to 1.5 and at depth to pier diameter ratios that range from 0.25 to 1.0. The final report titled "Scour Around Circular Bridge Piers at High Froude Numbers," FHWA-RD-79-104, was published. It is available through NTIS.
- C. Tye Engineering Inc. started a study, sponsored by FHWA, to deduce scourdata from the Hydrologic Survey team records in Louisiana. The Hydrologic Survey team in Louisiana routinely monitors stream bed cross sections at approximately 90 bridge sites. Their records provide a valuable source of field data for scour around bridge piers. The study was completed. The final report titled "Scour Around Bridge Piers Field Data from Louisiana Files," FHWA-RD-79-105, is being printed; it will be available through NTIS.
- D. The USGS continued the FHWA study on "Roughness Coefficients in Vegetated Flood Plains." The study took advantage of data collected by completed HP&R studies in the Gulf Coast States of Louisiana, Mississippi, and Alabama. Detailed data will be used to field validate methods of roughness coefficient estimation which have been developed theoretically and only laboratory tested. The study will strive to attain quantitative methods that are relatively simple to apply and result in accurate estimates; at a minimum it will provide comparative methods that will make present estimates more consistent.

Control of Stream Instability at Highway Crossings - The objectives of these studies are to evaluate the significance of natural stream adjustments on the structural integrity of highway crossings, to provide techniques for resolving the impact of these changes, and to provide guidelines for measures to mitigate stream instability at highway stream crossings.

The U.S. Geological Survey completed a research study for FHWA titled, "Countermeasures for Hydraulic Problems at Bridges." Guidelines were developed to assist design, construction, and maintenance engineers in selecting measures that can be used to reduce bridge losses attributable to scour and bank erosion. These guidelines are based on case histories of 224 bridge sites in the United States and Canada, on interviews with bridge engineers in 34 States, and on a survey of published work on countermeasures. Each case history, published in volume two of the final report, includes data on bridge, geomorphic, and flow factors; a chronological account of relevant events at the site; and an evaluation of hydraulic problems and countermeasures. Performance ratings are given for rigid and flexible pavement, flow control measures (spurs, dikes, spur dikes, jack fields, retards and check dams), and measures incorporated into the bridge design. Streams are classified for engineering purposes into five major types, each having characteristics of lateral stability and behavior that need to be taken into account in the design of bridges and countermeasures. The final reports titled "Countermeasures for Hydraulic Problems at Bridges, Vol. 1 Analysis and Assessment, and Vol. 2 Case Histories of Sites 1-283," FHWA-RD-78-162 and 163, were published. They are available through NTIS: PB 297132/AS and PB 297685/AS. In addition to the two volume final report, a slide-tape presentation which depicts the major aspects of the research is available from FHWA.

The countermeasures project brought to light that stream alteration work for highway crossings has been curtailed in many regions and prohibited in a few. This is unfortunate because well conceived and constructed channel alterations of limited extent are often both environmentally and economically advantageous over other more extensive countermeasures. A modification to the original study was made to document numerous channel changes done by highway agencies to show why they were successful or caused problems. This study will result in a separate report that can aid highway engineers in utilizing their experience in stream engineering to provide stream crossings that are environmentally sound and hydraulically efficient.

- B. A FHWA contract titled "Methods for Assessment of Stream-Related Hazards to Highways and Bridges" was completed by Colorado State University. The study resulted in a systematic evaluation approach for determination of hydraulical conditions at a stream crossing, giving consideration to the entire stream environment including its geology, geomorphology and land use on the flood plain. By using this approach, the hydraulic or bridge engineer is less likely to overlook a hydraulic problem and complete his site evaluation with greater ease and confidence. The research report will be published in 1980.
- C. Tye Engineering of Fairfax, Virginia, completed an FHWA study titled "Debris Problems in the River Environment." This study shows that waterborne debris accumulation is a recurring problem in many regions of the United States, and that the potential for debris hazards can be reduced by using the proper crossing design parameters. The study provides a survey of highway related debris problems and describes the measures presently taken by highway agencies to cope with debris hazards. The research report titled "Debris Problems in the River Environment," FHWA-RD-79-62, was published and is available through NTIS.

D. Sutron Corporation of Rosslyn, Virginia, continued the FHWA research study on "Stream Channel Degradation and Aggradation: Causes and Consequences to Bridges." The severity of degradation and aggradation nationwide and the factors associated with these processes were documented in an interim report which will be published in 1980. The final report will provide the best available methods for determining the extent of the stream grade change given the onsite and watershed conditions.

<u>Control of Sediment Produced by Highway Construction</u> - This problem consists of two stages: during construction and just after construction.

- A. It is important that during the construction of highways, the sediment produced by roadway excavation and embankment construction must be controlled so it will not pollute the natural streams. Sponsored by the Pennsylvania Department of Transportation, the Pennsylvania State University and the U.S. Geological Survey completed the cooperative research study titled "Prediction of Sediment Flow from Proposed Highway Construction Sites." This study capitalizes on the extensive work of others by utilizing modified Universal Soils Loss Equation which has incorporated a factor for surface runoff. The study produced a computer program that can be accessed from any of the State's district offices and allows the engineer to try numerous sediment control methods mathematically before attempting to use any measures in the field. The final report was being prepared.
- B. The U.S. Geological Survey Hawaii District, through the sponsorship of Hawaii Department of Transportation, continued its study on Rainfall—Runoff and Rainfall—Sedimentation Discharge Relations in Hawaiian—type Watersheds. The objective of this study is to determine the effects of highway construction on the rainfall—runoff and rainfall—sedimentation discharge relations of a watershed in Moanalua Valley, Oahu, considering all significant basin characteristics. The results obtained will be used as a basis for deriving similar relations for other basins in Hawaii. Data collection and analysis were continued in 1979. The draft final report was being prepared.
- The Utah State University, under the National Cooperative Highway Research С. Program administered by the Transportation Research Board, completed a 2-year study on Erosion Control During Highway Construction in CY 1977. The objective is to develop more effective techniques and materials to control erosion during highway construction activities. It consists of three major parts: to assess the effectiveness of methods presently being used throughout the United States, to develop a manual of recommended techniques and design criteria for the control of erosion, and to identify research needs. An experimental research study was also conducted in 1978 in the Utah Water Research Laboratory using a rainfall simulator and test bed to determine the validity of the Wischmeier's water-caused erosion equation on steep slopes, and to test the effectiveness of selected erosion control products. The final report consists of three volumes: Volume I - a summary of the research, Volume II - an erosion control manual, and Volume III - bibliography. Volumes I and II were revised and will be published in 1980.

- D. Another NCHRP study which synthesized existing information on "Design of Sedimentation Basins" was completed by W. O. Ree of Stillwater, Oklahoma. The final report will be published soon.
- The USGS, district office at Harrisburg, Pennsylvania, completed a research project titled, "Field Evaluation of Erosion Control Measures used in Highway Construction" under the HP&R program. The object of this study is to evaluate different types of erosion and sediment control measures to determine the ability of each measure to prohibit sediment from entering a stream system, and to determine if sediment concentrations and discharges return to their preconstruction levels once the construction has ended. The study area consists of five Sediment ponds built on and off streams, small rock dams, seeding, mulching, and erosion control measures used before the issuance of erosion-control guidelines were compared with the use of sediment and discharge measurements. Sediment load and turbidity were shown to be much higher in the drainage basin protected by the onstream ponds than that protected by offstream ponds. The final report will be published soon.
- F. The Virginia Highway Research Council began work on "Efficiency of Erosion Control Practices" for the Virginia Department of Highways and Transportation (VDHT) under the HP&R program. Current VDHT erosion and sediment control practices will be evaluated. Optimum erosion and sediment control will be determined using the highest practical design and construction procedures and maintenance of control technology.
- G. A case study under the HP&R program was begun by South Carolina Department of Highways to determine the "Effects of Highway Construction on Stream Turbidity and Suspended Solids." Turbidity and suspended solids will be monitored upstream and downstream of a highway project before, during, and after construction. These data will be evaluated with construction schedules and practices.
- H. It is equally important that upon completion of highway construction, immediate and adequate protection against erosion be provided for slopes and other roadside areas affected by grading. In most regions of the country this has been accomplished with the establishment of proper management of vegetative cover. In 1979, 17 States were conducting studies designed to improve vegetation establishment techniques and subsequent management practices. The participating States were Alaska, Alabama, California, Georgia, Hawaii, Indiana, Louisiana, Maryland, Massachusetts, Minnesota, Montana, New Jersey, Rhode Island, Texas, Washington, West Virginia, and Wyoming.

<u>Control of Highway Water Quality</u> - The objectives of these studies are to monitor the highway water pollution parameters and to devise cost effective means to control them.

A. To help States to measure their local highway water pollution parameters, FHWA updated a monitoring manual which provides simplified field procedures for the water quality tests and hydraulic measurements. Besides total suspended solids (non-filterable residue), the tests cover turbidity, pH, temperature, electrical conductance, dissolved oxygen, settleable matter, and dissolved solids (filterable residue). Rainfall and streamflow measurements are also included.

Bellinger, W. Y., and Bergendahl, B. S., "Highway Water Monitoring Manual," report FHWA-DP-43-2, Federal Highway Administration, Region 15, Arlington, Virginia, January 1979.

B. For the development of erosion and sediment control plans in the location, design, and construction of a highway, FHWA published a manual. It is a compilation of the erosion and sediment control measures which have beer successfully used by Region 15 of FHWA. The measures covered include silt fences, brush barriers, diversion channels, sediment traps, check dams, slope drains, and temporary berms. A section on water quality monitoring is also included.

Richards, D. L., and Middleton, L. M., "Best Management Practices for Erosion and Sediment Control," report FHWA-HD-15-1, Federal Highway Administration, Region 15, Arlington, Virginia, December 1978.

- C. The University of Arkansas completed the HP&R study on "The Effects of a Channel Relocation Project on the Ecosystem of Little Sugar Creek, Benton County, Arkansas" for the Arkansas State Highway and Transportation Department. This highway construction associated research evaluated the effects on aquatic populations, water quality, and other plant and animal communities. The final report will be published soon.
- D. The California Department of Transportation continued the HP&R study on "Long Range Effects on Aquatic Ecosystems from Adjacent Highway Construction." This study investigates the effects on the aquatic environment from channel alterations resulting from highway construction on perennial streams and evaluates selected mitigation techniques employed to minimize these impacts.
- E. The Pensylvania State University, sponsored by the Pennsylvania Department of Transportation, started the HP&R study on "The Impact of Stream Relocation on Fish Populations Bull Creek." This research will study fish populations, bottom fauna, and water quality in Bull Creek before, during, and after stream relocation for construction of the Allegheny Valley Expressway.

If more information is desired about these research studies, inquiries should be addressed to the sponsoring agencies.

GEOLOGICAL SURVEY

PROJECT TITLE: A Study of Measurement and Analysis of Sediment

Loads in Streams

WRD PROJECT NO: NR 39-081

LOCATION: Topical Research

PROJECT CHIEF: Skinner, John V.

HEADQUARTERS OFFICE: Minneapolis MN

PROBLEM: Knowledge of factors governing the movement and deposition of sediment in streams and reservoirs is of major importance to agencies involved in development of water and land resources of the nation. A knowledge of the sediment discharge of streams is essential to the efficient design and operation of projects for the storage and use of streamflow. Movement of sediment also affects aquatic life and plays a role in the transport of certain types of chemical pollutants. Complicity of sediment phenomenon are such that comprehensive investigations are essential to support accurate conclusions.

OBJECTIVE: To seek solutions to problems related to equipment and methods for collecting and analyzing sediment samples, problems investigated are of common concern to two or more federal agencies. The project functions as (1) a center for the development of new sampling equipment for both manual and automatic operation (2) a center for procurement, testing, and calibration of sampling equipment for sale to federal agencies and (3) a focal point for review of new techniques and establishment of standard equipment and methods.

APPROACH: A knowledge of hydraulic requirements for accurate sediment sampling is combined with a knowledge of machine shop techniques, casting techniques, electric circuit theory to design new and improved samplers. Plans and specifications are prepared to allow equipment to be fabricated under contract. Technical reports that explain equipment and operating procedures are prepared and distributed to all interested agencies. New equipment is developed and tested under real and simulated field conditions.

PROGRESS AND RESULTS: Completed checkout of all hydraulic and instrumentation facilities for full scale calibration of bedload samplers.

Six different styles of Helley-Smith bedload samplers were tested with 6.5mm bed material and through a range of flow depths and velocities. A second test with 2mm sand was partially completed. A new depth integrating sampler, termed the D-77, was designed and after field testing final production modifications were completed. Tests verified that calibration of individual D-77 samplers will not be required. To facilitate point sampling of deep rivers, a new valve was designed for bag-type samplers. Established hydraulic design criteria for automatic syringe-type samplers and completed construction of sample conditioner for automatic sensor.

PLANS NEXT YEAR: Continue to support the bedload calibration tests. Complete development of the bag-type sampler, publish report on tests of automatic samplers, and write report on the Autopipette.

COMPLETED REPORTS:

February 1979 Operating Instructions D-77 Suspended Sediment Sampler

March 1979 Instructions for Peristaltic Pump, RP-77

CR097 Estuarine Intertidal Environments

Project Title: Hydrology of Estuarine Intertidal Environments

WRD Project No.: CR74-097

Location: Topical Research

Project Chief: Glenn, Jerry L.

Headquarters Office: Lakewood, Co.

Problem: Estuaries are subject to natural and artificial stresses that combine to threaten their continued utility to man. Many estuaries are filling with sediments from external (rivers and the ocean) and internal (shore erosion and biological production) sources. As a result, navigation often is difficult or impeded, maintenance of navigational channels is costly and continually necessary, and the value of recreational and commercial fisheries is diminishing. Estuarine intertidal and supratidal environments are particularly subject to man-induced stresses which directly alter valuable nursery and feeding grounds for many desirable forms of estuarine life.

Objective: (1) to establish and to evaluate qualitatively and quantitatively the sources of sediments in estuaries, with initial emphasis on the intraestuarine (intertidal and supratidal) source(s); (2) to characterize the nature and composition of sediments in, from, and beneath intraestuarine sources as an aid to understanding erosional, transportational, and depositional phenomena; (3) to document changes in intraestuarine sources as a result of man-induced stresses and to relate the changes to causative factors; (4) to provide data for making more intelligent predictions of the effects of nature and man in estuaries.

Approach: Aerial photographs and hydrographic and topographic data will be combined with field observations and samples in a reconnaissance survey of sedimentologic, geomorphic, and biologic attributes of intraestuarine sources. The stratigraphy of source areas will be investigated to aid in reconstructing the course of events that produced the present environments and in predicting the future course of events. Detailed field studies of modern sediment erosion, transport, and deposition in selected source areas will follow the stratigraphic phase and will be accompanied by laboratory determinations of the nature and composition of surface, subsurface, and suspended sediments.

Progress and Results - 1978: Time and space variations in nutrient and sediment concentrations were determined at proposed transport station cross sections in the Potomac Estuary. Temporal variations

were generally predictable and relatable to tidal changes. Cross sectional (lateral) variations were large at Piney Point, minimal at Quantico, and variable to poorly defined at Alexandria. Longitudinal variations in nutrient concentrations between Alexandria and Quantico reflect input from sources near Alexandria and dilution and exchange reactions during transport.

Progress and Results - 1979: The natural and anthropogenic development of eutrophication and sedimentation problems in the Potomac Estuary has been determined from (1) analyses of core sediments, (2) results from an acoustic subbottom survey, and (3) measurements of estuarine morphology. Sites and rates of sediment deposition have been determined from ²¹⁰Pb analyses. Major deposition sites (deposition rates from 1 to 5 cm/yr) include the riverine and upper estuarine parts of the main Potomac and the marginal embayments in the riverine part; slow deposition (<0.5 cm/yr) characterizes much of the lower estuarine part of the Potomac and the lower ends of adjacent marginal embayments. There is little evidence of changing deposition rates at most sites during the last 100 years, which suggests that deposition may be due mostly to changing natural conditions. The development of eutrophic conditions has been inferred from analyses of nutrientsconcentrations of core sediments. Although it appears that some nutrient species began to increase in prehistoric times, the rate of increase accelerated during the last 100 or so years, presumably as a result of increased anthropogenic inputs.

Completed Reports:

Glenn, J.L., 1979, Variations in nutrient and sediment concentrations in the Potomac Estuary: Abstract, Program for the Southeastern Section of the Geological Society of America, 28th Annual Meeting, Volume 11, No.4, p.180.

Glenn, Jerry L., 1979, Temporal and spatial variations in nutrient and sediment concentrations in the Potomac estuary <u>in</u> Seminar on Water Quality in the Tidal Potomac River, December 1978, Bennett, James P. (ed.): U.S. Geological Survey Open-File Report 79-1588, p.12-13.

CR098 Sediment Transport Phenomena

Project Title: Measurement and Prediction of Sediment Transport

Phenomena

WRD Project No.: CR74-098

Location: Topical Research

Project Chief: Hubbell, David W.

Headquarters Office: Lakewood, Co.

Problem: In alluvial streams, for every different hydrologic condition, the bed configuration, sediment transport, and hydraulic characteristics mutually change to achieve a quasi-equilibrium. The changes affect the ability of the stream to convey given quantities of water, accommodate navigation, transport and dilute solid and solute wastes, support aquatic biota, and perform similar functions. As yet, no positive means exists for predicting definitely the condition various variables, particularly bed configuration, will achieve for a given set of hydrologic conditions. As a result, optimum utilization and management of a waterway usually cannot be assured and, often, modifications designed to enhance the utility of a waterway are ineffective or have adverse effects.

Objective: To provide information for predicting sedimentation phenomena in alluvial stream so as to facilitate the successful utilization and management of such streams and waterways, particularly information on the formation and alteration of bed forms and on the factors, including bedload and bed-material load transport, that affect bed forms.

Approach: Initially, existing data will be analyzed to relate bed form characteristics and hydraulic and sedimentologic variables, and a bedload sampler will be developed to provide accurate measurements of bedload transport. Later, additional data will be obtained at selected sites by measuring bed form characteristics with acoustic instruments, including side-scan sonar; determining transport rates with bedload samplers; and defining other pertinent variables. Tracer techniques may be applied. Finally, data will be analyzed to define criteria for predicting bed forms and to provide a better understanding of sediment transport. Both sand-bed and gravel-bed streams will be studied.

Results last year: Data from bedload sampler calibration runs made in the calibration facility at St. Anthony Falls Hydraulic Laboratory with 6.5 mm bed material were analyzed to determine the sampling efficiencies of different versions of the Helley-Smith sampler. Comparisons of the means of sampled and measured rates showed that standard versions of the sampler had efficiencies well over 100 percent and versions with very low nozzle expansions had efficiencies less than 100 percent. This method of comparison to determine sampling efficiency is commonly used, however, it is valid only if the individual samples and the corresponding actual bedload transport rates at the time of sampling are related linearly.

Plans for next year: Previous and newly acquired calibration data will be analyzed in an effort to compute a sampling efficiency for each sampled rate. Such an anlysis will show whether or not the comparison of means is a valid procedure for determining the sampling efficiency of any particular sampler and if the efficiency varies with the transport rate or other factors.

Completed Reports:

Stevens, H.H., Jr., 1979, Computation of total sediment discharge by the modified Einstein procedure on an HP-67 or HP-97 calculator: U.S. Geological Survey Water Resources Division Bulletin, Oct.-Dec. 1978 and Jan.-June 1979, pp.35-41.

CR186 Bedload Samplers

Project Title: Bedload Samplers for Sediment in Streams: Develop-

ment and Calibration

WRD Project No: CR75-186

Location: Topical Research

Project Chief: Hubbell, David W.

Headquarters Office: Lakewood, Co.

Problem: Virtually all physical processes involving the removal of mineral resources from the earth's surface or from underground disturb the soil mantle, which, in turn, results in changes in surface erosional patterns. Mining resources for energy development very likely will result generally in increased erosion and delivery of sediment to existing stream channels. Much of the sediment will be transported in channels as bedload. Currently, there are no existing samplers that are completely satisfactory for measuring bedload transport. Measurements of this kind are essential for assessing the effects of changes in the occurrence and movement of sediment on channel geometry, water quality, and stream ecology.

Objective: To develop an acceptable sampler(s) for measuring the discharge of sediment particles that range in size from about 2 to 64 millimeters and are transported in streams as bedload, so as to permit the effects of energy development, particularly surface and subsurface mining activities, on streams to be monitored.

Approach: Initially, laboratory facilities capable of prototype testing of a variety of bedload samplers will be designed and constructed. Following this phase, existing promising samplers will be calibrated to define their efficiencies in sampling different particle sizes under various conditions. Then, as necessary, existing samplers will be modified and/or new samplers will be developed and subsequently calibrated and extensively tested. Based on laboratory results, the most satisfactory samplers will be recommended for use.

Results last year: Three runs with different flow conditions were completed in the St. Anthony Falls Hydraulic Laboratory bedload sampler calibration facility using bed material having a median diameter of 6.5 mm. In one of the runs, six different configurations of the Helley-Smith bedload sampler were tested, and in two other later runs data were obtained on the performance of the two standard versions of the Helley-Smith sampler and on the BTMA (Arnhem) sampler and a half-scale

version of the VUV sampler. Hydraulic and sediment transport data associated with each flow condition also was obtained. Preparation for runs with the next bed material involved sieving 400 tons of sand twice to produce material with a mean diameter of 2.1 mm.

Plans for next year: Calibration studies will continue using 2.1 mm bed material. At least four runs will be made with this material to evaluate six versions of the Helley-Smith sampler. Coarser bed material will be prepared for future runs.

CR75-187 Bedload Transport Research

WRD Project No: CR75-187

Project Chief: Emmett, William W.

Headquarters Office: Lakewood, Colorado

Field Location: Topical Research

Problem: Of all processes operating in river channels, and especially of those of practical concern to engineers and others interested in river channel behavior, perhaps the least knowledge is available regarding the hydraulic and mechanics of bedload transport. Before continuing advances in river channel behavior can be made, some understanding of the behavior of bedload sediment must be made.

Objective: (1) Define spatial and temporal variations in bedload transport rate for a single stage of flow; (2) define change in average magnitude of transport rate over a range in hydraulics of flow; (3) define change in average magnitude of transport rate over a range in channel geometry; and (4) analyze the data to evaluate the applicability of available bedload equations, suggest new coefficients for the existing equations, or propose new relations for predicting rates of bedload transport.

Approach: To use the conveyor-belt bedload-transport facility on the East Fork River near Pinedale, Wyoming, as a control to evaluate variability factors in bedload transport and to field calibrate the Helley-Smith bedload sampler; to use the calibrated Helley-Smith sampler in the systematic collection of bedload samples, along with the concurrent measurements of streamflow hydraulics, from a variety of sandand gravel-bed streams, and, within the laws of general physics, stochastically develop empirical relations of bedload transport and interpret the physical significance of the developed relations.

FY-1978 Progress: Field calibration of the sediment-trapping characteristics of the Helley-Smith bedload sampler have been completed. Continuation of data analysis and interpretation of information gathered at the conveyor-belt bedload-trap facility and at additional sites through the use of the Helley-Smith bedload sampler. Analysis underway to facilitate transfer of information from site-specific field areas to areal application and with application to watershed and channel flow/sediment modeling concepts.

FY-1979 Progress: Initiated at the conveyer-belt bedload-trap research facility a tracer study utilizing fluorescent particles to evaluate (1) residence time of sediment, (2) average speed of particles, (3) depth of bed material involved in transport, (4) dispersion of bed material, (5) short-term channel changes accompanying sediment transport, (6) influence of availability of sediment on transport rate, and other related aspects of sediment transport. Qualitative results are known,

and quantitative information is pending completion of detailed laboratory analysis of collected samples and computer manipulation of data.

FY-1980 Plans: Use image analyzer to determine particle sizes and concentration of fluorescent particles in (1) samples collected describing the stationary environment and (2) samples collected describing the material in transport. Use this information to refine a field procedure for an additional year of data collection as generalized above. Use the Helley-Smith bedload sampler at a variety of rivers to enlarge the data base necessary to extrapolate the specific information of the East Fork River tracer study to a universal application.

Completed Reports:

- Emmett, W.W. and Seitz, H.R., 1973 (1974), Suspended and bedload sediment transport in the Snake and Clearwater Rivers in the vicinity of Lewiston, Idaho March 1972 through June 1973: U.S. Geological Survey Basic-Data Report, 78 p.
- , 1974, Suspended and bedload sediment transport in the Snake and Clearwater Rivers in the vicinity of Lewiston, Idaho July 1973 through July 1974: U.S. Geological Survey Basic-Data Report, 76 p.
- Emmett, W.W., 1974, Channel aggradation in western United States as indicated by observations at Vigil Network sites: Zeitschrift fur Geomorphologie, Suppl. v.21, p.52-62.
- _____, 1974, Channel changes: Geological Society of America, Geology, v.2, no. 6, p.271-272.
- _____, 1974, Channel aggradation in western United States: Abstract, Proceedings, Twelfth Annual Engineering Geology and Soils Engineering Symposium, p.273.
- _____, 1974, Hydrologic environment of the upper Salmon River area,
 Idaho: Abstract, Transactions American Geophysical Union, v.55,
 no.2, p.77.
- , 1975, The channels and waters of the upper Salmon River area, Idaho: U.S. Geological Survey Professional Paper 870-A, 116 p.
- Leopold, L.B., and Emmett, W.W., 1976, Bedload measurements, East Fork River, Wyoming: Proceedings, National Academy of Sciences, v.73, no.4, pp.1000-1004.
- Emmett, W.W., 1976, Bedload transport in two large, gravel-bed rivers, Idaho and Washington: Proceedings, Third Federal Interagency Sedimentation Conference, pp.4-101 to 4-114.

- Druffel, L., Emmett, W.W., Schneider, V.R., and Skinner, J.V., 1976, Laboratory hydraulic calibration of the Helley-Smith bedload sediment sampler: U.S. Geological Survey Open-File Rept. 76-752, 63 p.
- Mahoney, H.A., and others, 1976, Data for calibrating unsteady-flow sediment-transport models, East Fork River, Wyoming, 1975: U.S. Geological Survey Open-File Rept. 76-22, 293 p.
- Leopold, L.B. and Emmett, W.W., 1977, 1976 Bedload measurements, East Fork River, Wyoming: Proceedings, National Academy of Sciences, v.74, no. 7, pp.2644-2648.
- Emmett, W.W. and Leopold, L.B., 1977, A comparison of observed sediment-transport rates with rates computed using existing formulas: <u>In</u> Geomorphology in Arid Regions (D.O. Doehring, Ed.), Proceedings, 8th Annual Geomorphology Symposium, State University of New York, Binghamton NY, Sept. 23-24, 1977, pp.187-188.
- Emmett, W.W., 1978, "Overland Flow" In Hillsope Hydrology (M.J. Kirkby, Ed.), John Wiley and Sons, pp.145-176.
- Emmett, W.W., Burrows, R.L., and Parks, Bruce, 1978, Sediment transport in the Tanana River in the vicinity of Fairbanks, Alaska, 1977: U.S. Geological Survey Open-File Rept.78-290, 28p.
- Emmett, W.W., and Thomas, W.A., 1978, Scour and deposition in Lower Granite Reservoir, Snake and Clearwater Rivers near Lewiston, Idaho, U.S.A.: Journal of Hydraulic Research, v.16, no.,4, pp.327-345.
- Emmett, W.W., 1979, A field calibration of the sediment trapping characteristics of the Helley-Smith bedload sampler: U.S. Geological Survey Open-File Rept. 79-411, 96 p.
- gram with abstracts, 32nd Annual Meeting, Rocky Mountain Section, Geological Society of America, v.11, no.6, p.271.
- Burrows, R.L., Parks, Bruce, and Emmett, W.W., 1979, Sediment transport in the Tanana River in the vicinity of Fairbanks, Alaska, 1977-78: U.S. Geological Survey Open-File Rept. 79-1539, 37 p.
- Emmett, W.W., 1980, A field calibration of the sediment trapping characteristics of the Helley-Smith bedload sampler: U.S. Geological Survey Professional Paper 1139.

CR102 Sediment Movement in Rivers

Project Title: Sediment Movement and Channel Changes in Rivers

WRD Project No.: CR75-102

Location: Topical Research

Project Chief: Meade, Robert H.

Headquarters Office: Lakewood, Co.

Problem: Sediment moves through river systems in response to specific events and changing conditions in drainage basins. These events and conditions are both natural (floods, climate changes) and artificially-induced (accelerated erosion, reservoirs, diversions, channelizations). The response often takes place over periods measurable in decades or longer. The morphology of the river channels changes as sediment moves through the system.

Objective: To assess: (1) changes in river sediment loads over periods of decades or longer, and the factors (natural and artificial) that cause the changes; (2) rates at which rivers change their courses, shapes, and other morphologic features, both in their natural state and in response to artificial influences; (3) effects of infrequent catastrophic events or large-scale human influences on the "equilibrium" sediment movement and channel morphology in rivers; (4) sources, pathways, and sinks of sediment in rivers.

Approach: Basically a historical approach, using available records and making some first-hand field studies. Records will include sediment-load data previously collected by USGS and other agencies; changes in channel morphology will be interpreted by comparing old and new maps plus available aerial photographs of selected rivers in the Upper Missouri basin. Field studies will include repeated surveys of selected channels and tracer studies of sediment movement.

Progress and Results for 1978 and 1979: The effects of the flood of May 1978 on Powder River (the largest since 1923) were documented in a 90-km reach in southeast Montana. Channel changes in the reach included two avulsive cutoffs and significant lateral bank erosion (up to 65 m at one monumented cross section). An average thickness of 10-15 cm of new overbank sediment was deposited on a 500-m width of the flood plain. The amount of sediment carried into the upper end of the 90-km reach during the flood was 10 percent greater than the amount carried out the lower end. The amount of sediment newly deposited on the flood plain was nearly twice the amount eroded from the channel. While the net effect of the flood on the channel was erosion, the net effect on the valley was aggradation.

In the East Fork River of western Wyoming, movement of fluorescent particles and changes in bed elevation during the 1979 snowmelt runoff event showed that bed material moved downriver in fairly discrete slugs. The bed material (median diameters 1.0-1.5 mm) is stored during low-water seasons in areas of the channel whose centers are about 500 m (25-30 channel widths) apart. Preliminary results suggest that the mean distance between centers of storage corresponds to the mean annual distance of bedload transport. Because the bed material moves in separate slugs rather than in a continuous blanket, the relations between water discharge and bedload transport are not uniform but vary markedly from one part of the river to another.

Completed Reports:

Nordin, C.F., Meade, R.H., and others, 1979, Particle size of sediments collected from the bed of the Amazon River and its tributaries in May and June 1977: U.S. Geological Survey Open-File Report 79-329, 23 p.

Meade, R.H., and others, 1979, Suspended-sediment and velocity data, Amazon River and its tributaries, June-July 1976 and May-June 1977: U.S. Geological Survey Open-File Report 79-515, 42 p.

Meade, R.H., and others, 1979, Sediment loads in the Amazon River: Nature, v.278, pp.161-163.

Curtis, W.F., Meade, R.H., and others, 1979, Non-uniform vertical distribution of fine sediment in the Amazon River: Nature, v.280, pp.381-383.

Meade, R.H., Nordin, C.F., and Curtis, W.F., 1979, Sediment in Rio Amazonas and some of its principal tributaries during the high-water seasons of 1976 and 1977: Associacao Brasileira de Hidrologia e Recursos Hidricos, Simposio Brasileiro de Hidrologia, Third, "Hidrologia da Amazonia," Anais, v.2, pp.472-485.

Nordin, C.F., Meade, R.H., and others, 1980, Size distribution of Amazon River bed sediment--No appreciable change in downstream direction: Submitted to Nature.

Meade, R.H., 1980, Man's influence on the discharge of fresh water, dissolved material, and sediment by rivers to the Atlantic Coastal Zone of the United States, in Burton, J.D., Ed., River Inputs to Ocean Systems: United Nations Educational, Social & Cultural Organization (in press).

Meade, R.H., 1980, The absence of steady state between soil erosion, sediment transport in rivers, and the delivery of river sediment to the oceans, <u>In Burton</u>, J.D., Ed., River Inputs to Ocean Systems: United Nations Educational, Social & Cultural Organization (in press).

Meade, R.H., 1980, Sources, sinks and storage of river sediment in the Atlantic drainage of the United States: Submitted to Journal of Geology.

Project Title: Rehabilitation Potential of Energy Lands

Project No: CR75-104

Project Chief: Shown, Lynn M.

Headquarters Office: Lakewood, Colorado Field Location : Topical Research

Problem: Hydrologic information with respect to rehabilitation potential, including erosion and sediment yields, is needed by local, State, and Federal governments and energy companies prior to decisions on leasing and mining of coal and oil shale. The information is needed on a timely basis; thus, reconnaissance techniques must be used to obtain much of the necessary data. The two facets of the problem are (1) definition of the conditions as they exist prior to mining, and (2) assessment of the potential for rehabilitation of land-water systems after mining.

Objectives: The objectives of this project related to erosion and sedimentation are to develop, refine, and apply reconnaissance techniques that will provide data to define baseline conditions and rehabilitation potential. Data collected include reservoir sediment yields, hillslope and exposure effects on erosion, slope changes in reconstructed topography, and channel erosion and aggradation.

Approach: The reconnaissance techniques used to characterize drainage basins include (1) relation of percent bare ground to runoff and sediment yield, (2) estimates of sediment yield using drainage basin and channel characteristics and reservoir sediment surveys, and (3) hill—slope and channel erosion and sedimentation monitoring by surveys of monumented transects.

Progress and Results: Sediment surveys of three stock ponds and channelgeometry measurements at 20 cross sections were completed in the Coal Creek, Oklahoma, Energy Minerals Resource Inventory and Analysis - a BLM program (EMRIA) basin that is being modeled. Vegetation maps were completed for the Coal Creek basin and for the Prairie Dog Creek, Montana EMRIA basin. Sampling and analyses were done to define soil-moisture relations for 11 soils in the Yellow Creek EMRIA basin in Alabama. Infiltration and soil detachability measurements were made with a portable rainfall simulating infiltrometer at the Bisti West and Ah-shi-sle-pah Wash EMRIA basins in cooperation with the New Mexico WRD District. Three comprehensive reports demonstrating hydrologic methodology data analyses, and information useful for determining impacts of surface mining and reclamation were prepared. These reports were requested by the Office of Surface Mining Reclamation and Enforcement (OSM) and were done for potential mine sites in southeastern Montana, south-central Wyoming, and northwestern New Mexico. The last two runoff/erosion plots in the Piceance basin, Colorado were abandoned owing to encroaching development on Oil Shale Tract Cb. Channel cross sections on Corral Gulch were resurveyed twice where flows occur resulting from dewatering of aquifers of Oil Shale Tract Ca. The complete network of channel cross sections and slope erosion transects in the Piceance basin were resurveyed.

FY1980 Plans: Several types of data will be collected in the Yellow Creek and Bear Creek, Alabama basins, which are to be modeled. Data collection will include mapping and measurement of vegetation, additional soil moisture and bulk density samplings, sediment surveys of two or three ponds downstream of mined areas, channel geometry measurements, and reconnaissance of the hydrology of Warrior Coalfield. A report will be prepared for OSM on the hydrologic effects of surface mining and reclamation for a potential mine site in the Yellow Creek basin. Sediment surveys are planned for several stock ponds in the Prairie Dog Creek, Montana basin. Erosion monitoring will be continued in the Piceance basin.

Completed Reports:

- Ringen, B. H., Shown, L. M., Hadley, R. F., and Hinkley, T. K., 1979, Effect on sediment yield and water quality of a nonrehabilitated surface mine in north-central Wyoming: U.S. Geological Survey Water Resources Investigations 79-47, 23 p.
- U.S. Department of the Interior, Geological Survey, 1978, Moisture relations in soils, vegetation, and sediment yields, in Resource and Potential Reclamation Evaluation—Hanging Woman Creek Study Area: Bureau of Land Management EMRIA Report No. 12, 1977, 309 p.

PROJECT TITLE: Sediment Movement and Hillslope Morphology

WRD PROJECT NO.: CR 4661-105

LOCATION: Worldwide

PROJECT CHIEF: Garnett P. Williams HEADQUARTERS OFFICE: Lakewood, CO

PROBLEM: Installation of a dam on a river traps the sediment load and alters

the pattern of the water discharge. The channel downstream reacts

to these imposed changes, sometimes drastically.

OBJECTIVE: To determine how a channel is likely to change downstream from a

dam.

APPROACH: Analysis is being made of aerial photographs and resurveyed cross

sections of river channels below some 44 damsites. Features of special interest are changes in mean bed elevation, channel width, vegetation, channel sinuosity and pattern. Records of water discharge, for the pre-dam and post-dam periods, show the change in

flow.

PROGRESS

AND

RESULTS: All resurveyed cross-section data have been obtained mostly from

the Corps of Engineers. Aerial photos are being ordered. Analysis of cross sections is under way but is not sufficiently advanced to

show any results.

COMPLETED REPORTS, 1978-1979 (Including related studies):

Williams, G. P., 1978, Hydraulic geometry of river cross sections -- theory of minimum variance; U.S. Geol. Survey Prof. Paper 1029, 47 p.

, 1978, The case of the shrinking channels -- The North Platte and Platte Rivers in Nebraska: U.S. Geological Survey Circular 781, 48 p.

, 1978, Bankfull discharge of rivers: Water Resources Research, Vol. 14, No. 6; p. 1141-1154.

, 1978, Historical perspective of the Platte Rivers in Nebraska and Colorado IN Graul, W.D., and Bissell, S.J., (tech. coord.), Lowland river and stream habitat in Colorado: A symposium (Greeley, Colorado, (October 4-5, 1978): Colorado Chap. Wildlife Soc. and Colorado Audubon Council, p. 11-41.

Rhodes, D. D., and Williams, G. P. (eds.), 1979, Adjustments of the flurial system (Proc. 10th Annual Binghamton Geomorphology Symposium); Dubuque, Iowa, Kendall/Hunt, 372 p.

Forest Geomorphology, Pacific Coast

WRD Project No.: WR74-089

Field Location: Forested steeplands of the Pacific Coast

Project Chief: Janda, Richard J.

Headquarters Office: Menlo Park, California

<u>Problem</u>: The rock types, topographic and tectonic settings, climates, and landuses in the geologically youthful mountains of the Pacific Coast are conducive to exceptionally rapid mass wasting and fluvial erosion. Types and rates of geomorphic processes are strongly influenced by living and dead vegetation and therefore readily modified by natural or management-related vegetation disturbance. Considerable public interest is focused on developing timber harvesting practices that will have minimal impact on water quality and aquatic habitat. Unfortunately, quantative knowledge of (1) hillslope erosion processes contributing to stream sediment loads, and (2) the influence of vegetation on both hillslope and channel processes is meager.

Objective: Study the manner in which different hillslope erosion processes influence stream sediment transport relationships and total sediment yield from small and intermediate sized forested basins. Study the ways in which living and dead vegetation influence erosion, transport, and deposition of sediment in forested environments.

Approach: Compile available stream sediment discharge data and attempt to relate various sediment discharge characteristics to basin parameters including dominant hillslope erosion processes, landuse, climate, and size. Study time-sequential aerial photographs to determine types and frequency of erosion processes. Map erosional landforms and monitor changes in landforms through repeated surveys of monumented cross sections, stake arrays, and bore holes. Collect auxiliary sediment discharge data for small basins where hillslope and channel processes are being intensively studied.

FY 1978 Progress: Analysis of landslide movement data suggested that complex slump-earthflow movement had to be monitored in much greater detail in order to assess the role of that process in contributing to stream sediment discharge. Thus, observations on two complex streamside landslides were expanded to include more frequent surveys of stake arrays, more detailed monitoring of toe erosion, determination of fluvial sediment transports in axial gully systems, installation on continuously recording strain gages, and determination of internal deformation through the use of a bore hole-accessed inclinometer. Continued surveying of 55 monumented channel cross sections together with determination of sediment discharge at seven gaging stations along Redwood Creek indicated that the head water reaches were experiencing scour and a reduction in suspended sediment discharge per unit area (SSD/A) relative to downstream areas; downstream reaches experienced local aggradation and SSD/A remained high.

Comparison of suspended-sediment transport curves (SSTCs) for streams draining different types of erosional terrane suggests that streams draining areas sculpted primarily by persistent slump earthflow movement have SSTCs with gentler slopes than SSTCs for streams draining areas sculpted primarily by episodic debris slides. Storm and landuse-accelerated erosion causes upward shifting of SSTCs with either no significant change in slope or a slight reduction in slope particularly at high water discharge.

Progress for FY 1979: Analysis of intensively monitored complex streamside landslides indicate that movement occurs primarily during pulses of rapid movement separated by periods of slow persistent movement. Initiation and acceleration of movement occur in immediate response to specific rain storms, but amounts and rates of movement during specific pulses are not simply related to rainfall input, antecedent moisture, or ground water levels. Late season pulses seem disproportionately large relative to early season pulses associated with comparable hydrologic conditions. Movement persists after major erosion-causing storms and rapidly refills in-channel and near-channel sediment storage areas along streams on and adjacent to this type of landslide. Thus, high sediment transport associated with low and moderate water discharge in complex landslide terrane can be accounted for by the consistent availability of readily erodible sediment in and adjacent to stream channels.

Twelve of nineteen gaging stations in northwestern California with five or more consecutive years of daily suspended-sediment discharge records have mean annual SSD/A's larger than 1000 t/km²; the range in mean annual SSD/A for these nineteen stations is 162 to 3000 t/km². No definitive relation exists between SSD/A and drainage area for these streams. However, when the data are adjusted for differences in geology, a roughly linear relationship with a positive slope is suggested. In geologically youthful mountains, unlike low relief agricultural areas in the Central and Eastern United States, a positive correlation between SSD/A and drainage area is not unrealistic because high sediment producing landslide areas tend to be concentrated along deeply incised higher order stream channels. In this wet environment SSD/A is positively correlated with precipitation because increasing soil moisture and ground water levels result in increased susceptibility to mass failure.

<u>Plans for FY 1980</u>: Continue to study how the timing, amount, and type of hillslope erosion influences suspended sediment transport curves. Continue to study the variability and total sediment yield and sediment transport characteristics of small streams draining unharvested forested drainage basins. Continue geomorphic monitoring in the drainage basins of Redwood Creek (California) and Bull Run (Oregon).

Completed Reports:

Harden, D. R., Janda, R. J., Nolan, K. M., 1978, Mass movement and storms in the drainage basin of Redwood Creek, Humboldt County, California--a progress report: U.S. Geol. Survey open-file report 78-486, 161 pp.

- Janda, R. J., 1978, Summary of watershed conditions in the vicinity of Redwood National Park: U.S. Geol. Survey open-file report 78-25, 82 pp.
- Janda, R. J., 1979, Summary of regional geology in relation to geomorphic form and process <u>in</u> A guidebook for a field trip to observe natural and management-related erosion in Franciscan terrane of Northern California for Cordilleran Section of the Geological Society of America, p. II-1 II-17.
- Janda, R. J. and Nolan, K. M., 1979, Stream sediment discharge in Northwestern California in A guidebook for a field trip to observe natural and management-related erosion in Franciscan terrane of Northern California for Cordilleran Section of the Geological Society of America, p. IV-1 IV-27.
- Janda, R. J. and Nolan, K. M., 1979, Road log for day I <u>in</u> A guidebook for a field trip to observe natural and management-related erosion in Franciscan terrane of Northern California for Cordilleran Section of the Geological Society of America, p. VIII-1 VIII-26.
- Nolan, K. M. and Janda, R. J., 1979, Recent history of the main channel of Redwood Creek in A guidebook for a field trip to observe natural and management-related erosion in Franciscan terrane of Northern California for Cordilleran Section of the Geological Society of America, p. X-1 X-16.
- Nolan, K. M. and Janda, R. J., 1979, Recent history of the surface morphology of two earthflows adjacent to Redwood Creek in A guidebook for a field trip to observe natural and management-related erosion in Franciscan terrane of Northern California for Cordilleran Section of the Geological Society of America, p. XI-1 XI-10.
- Nolan, K. M., 1979, Graphic and tabular summaries of changes in stream-channel cross sections between 1976 and 1978 for Redwood Creek and selected tributaries, Humboldt County, and Mill Creek, Del Norte County, California: U.S. Geol. Survey open-file report 79-1637, 38 pp.
- Janda, R. J. and Nolan, K. M., 1979, Geomorphic controls on the form of suspended-sediment transport curves <u>in</u> Abstracts with Programs, Rocky Mountain Section of the Geological Society of America, Vol. 11, No. 6, p. 275.
- Janda, R. J., Nolan, K. M., and Stephens, T. A., 1979, Styles and rates of landslide movement in slump-earthflow-sculpted terrane, Northwestern California in Abstracts with Programs, Cordilleran Section of the Geological Society of America, Vol. 12, No. 3, p. 113.

Project Title: Arctic Stream Processes

WRD Project No.: WR-4761-138

Location: Alaska

Project Chief: Scott, Kevin M. Headquarters Office: Menlo Park, CA

Problem: Arctic streams have been contradictorily described as highly unstable, with high rates of bank erosion, and unusually stable, with low rates of bank erosion relative to streams of similar size elsewhere. In general, little is known of the behavior of arctic streams.

Objective: 1) To describe the character and rates of bed and bank processes in arctic streams; to indicate what factors influence variation in rates of erosion and sedimentation—in short, to supply the information needed for engineering design and impact assessment concerning stream behavior in the Arctic. 2) To compile a specifically annotated bibliography of arctic stream processes. Because many papers dealing with arctic stream processes did so incidentally to other studies, author abstracts and the usual bibliographic compilations are of little use.

Progress and Results: 1) Data collected from 1976-77 provide the basic description of how, when, and under what conditions streams in the Arctic erode their banks. Data collected in 1979 are partially analyzed and indicate how sediment transport varies with thermal regime and type of bed and bank material in a group of streams. 2) The bibliography was completed and has just been released as WSP 2065.

Completed Reports (1978-79):

Scott, K. M., 1978, Effects of permafrost on stream channel behavior in arctic Alaska: U.S. Geological Survey Professional Paper 1068, 19 p.

Scott, K. M., 1979, Arctic stream processes--an annotated bibliography: U.S. Geological Survey Water-Supply Paper 2065, 78 p.

Project Title: COUNTERMEASURES FOR HYDRAULIC PROBLEMS AT BRIDGES

WRD Project No.: WR 153

Location: National

Project chief: Brice, J. C.

Headquarters office: Menlo Park, CA

Problem: Damage to bridges by streams amounts to a large dollar loss each year in the U.S., and experience has shown that this damage can be reduced by the use of countermeasures. Information is needed for selection of the most effective countermeasure to be used in a particular situation.

Objective: To provide guidelines to assist design, maintenance, and construction engineers in selecting measures to reduce bridge losses attributable to scour and bank erosion.

Approach: To document and analyze bridge sites where hydraulic problems have occurred and countermeasures have been employed; and to interview bridge engineers regarding the effectiveness of countermeasures that have been used.

Progress and results: Case histories have been prepared for 224 bridge sites in the U.S. and Canada and bridge engineers in 34 states have been interviewed. Problems at piers occurred at '70 sites and problems at abutments, at 80 sites. Problems are attributed to lock scour at 50 sites, to general scour at 55 sites, and to lateral stream erosion at 105 sites. Performance ratings are given for rigid and flexible revetment, for flow-control measures (spurs, dikes, spur dikes, check dams, jack fields), and for measures incorporated into the bridge. Streams are classified for engineering purposes into five major types, each having characteristics of lateral stability and behavior that need to be taken into account in the design of bridges and countermeasures. Hydraulic analysis has been carried out for flood conditions at 60 bridges, for which values of flow, bridge, and geomorphic factors are tabulated.

Completed reports:

Brice, J. C., Blodgett, J. C., and Others, 1978, Countermeasures for hydraulic problems at bridges; Vol. 1, Analysis and assessment, 184 p; Vol. 2, Case histories for sites 1-283, 542 p.: Federal Highway Administration Report No. FHWA-RD-78-162.

Project Title: STABILITY OF STREAM CHANNELS ALTERED FOR BRIDGE OR HIGHWAY

CONSTRUCTION

WRD Project No.: WR 153

Location: National

Project chief: Brice, J. C.

Headquarters office: Menlo Park, CA

Problem: In the construction of bridges and highways, relocation or other alteration of stream channels is commonly desirable in order to avoid crossings, to improve stream alinement at bridges or culverts, or to accommodate a proposed road location. Because of regulations by various governmental agencies, most state hydraulic engineers are now hesitant to recommend any alteration of natural channels, even where minor changes would result in substantial savings in cost or increase in safety. However, there is little published documentation of the actual effects of past channel relocations on channel stability.

Objective: To provide information on the consequence of past channel alterations, for use in decisions regarding future alterations.

Approach: To prepare case histories of sites where channel alterations have been made sufficiently long ago (usually no less than 15 yr) that the effects of alteration on channel stability can be evaluated; and to isolate the dominant factors that have been associated with stability or instability of the altered channel and adjacent reaches of the natural channel.

Progress and results: Plans, maps, aerial photographs, and flow data have been collected for 109 sites where channel alterations have been made. Case histories have been prepared for 55 of these sites.

Completed reports: none

DEPARTMENT OF THE INTERIOR--OFFICE OF SURFACE MINING

Dredging Demonstration Project

The Department of the Interior's Office of Surface Mining recently awarded a grant to a Missouri dredging company. The purpose of the grant was to enable a demonstration of successful sediment removal.

The sediment was removed from a Peabody Coal Company pond near Macon, Missouri. This removal was the first time that amphibious equipment was successfully used for such an operation. The hydraulic power auger and submerged pump, the Mud Cat Model SP-810 hydraulic dredge, easily removed 1154 cu yd of sediment and pumped a slurry concentration of 237 g/l to a disposal area 1000 feet away. This equipment was economically and scientifically more efficient than land-based equipment. The dragline cost was \$5.00 per cu yd, dredge cost was \$1.00 per cu yd, and the front-end loader was \$15.70 per cu yd, under optimum conditions. Operator experience with the dredge was an important factor in achieving the desired results.

OSM hopes to assist in a variety of similar projects in the future.

DOI/OSM Sedimentation Ponds Rules 30 CFR 816.42, 816.46 816.42

and 816.46

The Department of Interior's Office of Surface Mining issued final regulations in March 1977, for control of sediment in discharges from areas of surface coal mining and reclamation activities. These rules established specific limitations called "effluent limitations" on the total suspended solids (TSS), iron and maganese content of the discharges from the mining area. They also required that all runoff be passed through sedimentation ponds and established design criteria for these ponds. The TSS standards were almost identical to those published by U.S. Environmental Protection Agency (E.P.A.) in 1977, OSM regulations were based on the best available technical information. However six months later, two contracted studies contradicted the rules of the two agencies. These studies claimed that discharges from ponds might not be able to meet the TSS effluent limitations during precipitation events.

A petition was filed with the department and published in the Federal Register requesting the immediate suspension of the regulations. OSM suspended some of its regulations.

E.P.A. followed a similiar procedure and late last year amended its regulations to grant an exemption from compliance with the effluent limitations during rainfall events to operations whose facilities are designed, constructed and maintained to treat or contain a 10 year-24 hour precipitation event or snowmelt of equivalent size.

E.P.A. expects to publish its final regulations this fall, based on a Nation wide study of representative sedimentation ponds. OSM suspended its regulations last year and is presently considering several options which of course, would follow the required procedures including the public participation.

The options are:

Options A would readopt its present regulations which fulfill the requirement of the Act but do not agree with the studies.

Option B would adopt a rainfall exemption modified either to increase or decrease the size of the precipitation event to which 'exemption is keyed (presently 10year-24hour) but would adopt the effluent limitations.

Option C is identical to Option B except that the sedimentation pond design criteria would be modified to reflect the findings of the two studies.

Option D would readopt the effluent limitations and would delete design criteria concerned with the size of sedimentation ponds.

Option E and Option F are variations of ones mentioned above.

Option G which is the most feasible option, would readopt the current effluent limitations and apply them only to base flow and would adopt a rainfall event effluent limitation to be based on EPA field data.

SCIENCE AND EDUCATION ADMINISTRATION--AGRICULTURAL RESEARCH

ARIZONA

Research activities at the Southwest Rangeland Watershed Research Center in Tucson, Arizona include the following:

- 1. Procedures were developed to predict channel morphology for small streams and to relate channel morphology to sediment yield. Sensitivity analysis showed the response or adjustment of stream channels due to changes in discharge or channel characteristics which might result from changing land use. The procedures provide a basis, from hydraulics of open channel flow and a simple erosion equation, to quantitatively evaluate the relationships between channel morphology and sediment yield.
- 2. Rainfall simulators were used to study soil detachment by raindrop impact. Simulator data are being used to relate detachment rate to soil erodibility, vegetative cover, development of erosion pavement, and rainfall intensity.
- 3. Experimental procedures have been developed to evaluate a forward scattering laser apparatus used to determine the particle size distribution of soils and sediments in stream flow. Work is continuing to compare results with those from hydrometer and pipette analysis.
- 4. Work on the USDA-SEA nonpoint source pollution modeling effort, under the direction of W. G. Knisel, Jr., has continued. The field-scalε erosion and sediment yield model has been developed and tested for a variety of conditions. Documentation including model development, users manual, and supporting information has been prepared for a USDA Conservation Research Report. Efforts are continuing to refine and improve the field-scale model and to develop a more comprehensive basin-scale model.
- 5. Runoff/sediment concentration samples were collected from a number of small experimental watersheds including eight watersheds on the Sarta Rita Experimental Range. These samples are being used to evaluate a brush conversion-rotation grazing experiment and to determine the influence of these practices on runoff and sediment yield.
- 6. Data from small experimental watersheds are being used to evaluate factors in the Universal Soil Loss Equation under semiarid rangeland conditions. Research is continuing to develop procedures to represent the influence of erosion or desert pavement on the C-factor.

For additional information contact Dr. Kenneth G. Renard, Research Leader, Southwest Rangeland Watershed Research Center, 442 East Seventh Street, Tucson, Arizona 85705.

U.S. Department of Agriculture Science & Education Administration-Agricultural Research

GEORGIA

Research activities at the Southeast Watershed Research Laboratory include the following:

- 1. Hydrologic, sediment, and chemical transport studies are underway on small mixed use, agricultural watersheds in the Southern Coastal Plain. Five years of continuously monitored data are available from one 6.5 mi² drainage area (Watershed K) and ½ years data on three other continuously monitored drainages ranging from 6 to 8.5 mi². Rainfall, streamflow, and shallow alluvial groundwater stages are monitored on a continuous basis (5 min. to 1 hour) and streamflow is sampled automatically (1 to 3 samples/day). Suspended sediment concentration in streamflow is determined as well as a range of water quality parameters.
- 2. Sediment delivery from a 6.5 mi² watershed (K), for the 2-year period 1975-1976 was estimated to be 5% of the estimated gross soil movement (based on USLE) from within the watershed. Sediment delivery ratios varied with season, with maximums occurring December-February, and minimums occurring June-August. Multiple regression relationships were developed for predicting seasonal SDR values based on season, runoff amount, and rainfall-runoff-season interactions.
- 3. Suspended sediment yields moving in streamflow from Watershed K, for the three-year period 1975-1977, averaged 385 kg/ha/yr.
- 4. Seven small cropped study areas (≈ 1 to 4 acres each) are being instrumented for evaluation of alternate cultural and residue management practices on sediment production from agricultural areas. Suspended sediment loads will be determined under both conventional and minimum tillage and under varied residue management (biomass production) schemes.

For additional information, contact:

Loris E. Asmussen, Director Southeast Watershed Research Laboratory USDA-SEA-AR P. O. Box 946 Tifton, GA 31794

IDAHO

Research at the Northwest Watershed Research Center, Boise, Idaho includes the following:

- A major storm with rain on snow and frozen soil January 11, 1979, produced the third highest peak runoff of record at the Reynolds Creek Outlet station. Sediment yield from this one storm produced about 50 percent of the yearly sediment discharge at the station. Sediment yields ranged from 33 to 84 percent of average in 1979 as a result of below normal precipitation and runoff.
- 2. The Pacific Southwest Inter-Agency Committee (PSIAC) procedure for predicting sediment yield was modified and used in this study to compare with predicted soil loss by the Universal Soil Loss Equation (USLE). Results showed that predicted PSIAC sediment yields were about 70 percent of predicted USLE soil loss on a watershed basis and that average predicted PSIAC sediment yields were within 15 percent of measured yields.
- 3. Watershed management on the Boise Front near Boise, Idaho, reduced 1978-79 sediment transport in Cottonwood Creek to about 10 percent of 1939-40 amounts. This dramatic reduction in sediment transport resulted from effective fire suppression, contour trenching, seeding, grazing management, and closing of critical areas to ORV use.

For additional information contact C. W. Johnson, Suite 116, Patti Plaza, 1175 South Orchard, Boise, Idaho 83705.

INDIANA

Activities at Lafayette, Indiana include the following:

- 1. Runoff and soil loss from farm fields and watersheds are the result of so many complex variables that complicated models must be used in their estimation. Many erosion and runoff models in use today require estimates from single storm events rather than long term average values now available. In a study just completed data used to derive the Universal Soil Loss Equation along with data collected since 1965 were used to evaluate erosivity factors for single storms. Results showed rainfall factors which included both rate and volume were best. Lumped erosivity factors that included rainfall volume, rainfall intensity, and runoff volume were better estimators of erosion than the presently used rainfall energy intensity value. Erosivity factors having separate terms for rainfall and runoff erosivity were even better.
- 2. In results obtained using the USDA rainulator in August, 1979 on a long term (18 year) experiment in continuous corn at Wooster, Ohio, soil loss was 9.5 tons per acre for a plow, disk harrow (conventional) system, 8.3 tons per acre for plow plant and 0.36 tons per acre for no-till. This is a 26 fold difference between no-till and conventional. The effectiveness of plow planting in controlling erosion was expected to be great early in the season and much less in August as these results show.
- 3. Data collected from field plots with mulch and grass strips under simulated rainfall used to show that the transport relationships in CREAMS (a model for Chemicals, Runoff, and Erosion from Agricultural Management Systems) accurately describe particle segregation during deposition by overland flow entering strips of corn stalks and grass.
- 4. Of six stream flow sediment transport equations evaluated, the Yalin equation gave the best results for transport of sand, coal, and soil aggregates for slopes and discharge rates characteristic of overland flow on farm fields. The equations were tested without calibration using parameters recommended in the literature. A manuscript describing the results is under review.
- 5. The prototype of the new rainfall simulator performed well in a field environment. Rainfall characteristics are much improved over those of the current simulator. Some components proved too heavy to be easily handled and have been redesigned and rebuilt for further field testing.
- 6. A contract for the National Soil Erosion Laboratory on the Purdue campus was let on December 5, 1979 to Goepel and Demars, General Contractors of Indianapolis, IN. Construction will begin March 4, 1980 with completion expected in the summer of 1981. Purdue University was awarded the contract for inspection services. The laboratory will house eight scientists and about 15 support staff.

For additional information contact W.C. Moldenhauer (SEA, Agronomy Department, Life Science Building) or G.R. Foster (SEA, Agricultural Engineering Building) Purdue University, West Lafayette, Indiana 47907.

IOWA

Research activities at the North Central Watershed Research Center, Columbia, Missouri, include:

- l. Continued measurement of soil losses and affecting variables from four field-size watersheds, and several subwatersheds, near Treynor, Iowa. Measured soil losses, 1964-79, were compared with soil losses computed from the depletion of Cesium 137 radioisotope in the soil profile and with surveyed landform changes, 1969-78 on a representative subarea, 75×840 ft.
- 2. The migration of eroding headscarps, along with profile and crossection changes, was monitored on four gullies and two channel systems in southwest Iowa. Instrumentation to define the mode of failure of streambanks after passage of headscarps was continued at two locations.

For additional information contact Carroll R. Amerman, Watershed Research Unit, 207 Business Loop 70 East, Columbia, Missouri 65201.

Minnesota

Current research at the St. Anthony Falls Hydraulic Laboratory, Minneapolis, Minnesota, is on the local scour caused by a cantilevered spillway or culvert pipe discharging onto a bed of cohesionless sand. Variables partly investigated are bed material size (d_{50} = 0.5, 1, 2, 4, and 8 mm), standard deviation of bed material size (1.2, 1.4, and 1.6), effect of pipe elevation relative to the tailwater elevation (-2, -1, 0, 1, 2, 4, and 8 pipe diameters), and effect of pipe slope. The temperature is maintained constant at 20° C. Dimensionless discharges $Q/\sqrt{gD^5}$ are 0.5, 1, 2, 3, 4, and 5. (Q is the discharge, g is the acceleration due to gravity, and D the pipe diameter.) The flow is interrupted and the scour hole is measured at 10, 31.6, 100, 316, 1000, 3162, and 10000 minutes after the beginning of each test. Because the apparatus would otherwise have been idle for lack of a technician, one scour test was allowed to continue to see if it reached a limit. Sediment was still being carried from the scour hole after 14-1/4 months. Current work is on data analysis of the 77 test series and nearly 525 scour holes. Analyses made so far show that the scour hole contours, expressed as a percentage of the maximum depth of scour, can be reduced to a single set of elliptical contours for all 6 discharges, all 7 scour periods, all 5 sizes and 2 gradations of bed material, and the 7 pipe heights for which data have been analyzed if suitable normalizing parameters are chosen. These analyses were limited to those data where the discharges were insufficient to cause "beaching," i.e., excessively widen the surface of the scour hole. The normalizing parameters have been described mathematically. The developed relationships will be checked against the original data to see how well the mathematical model represents the data. An analytical method has been developed that predicts the asympototic dimensions of the scour hole, that is the scour hole dimensions at infinite time. A paper describing this method has been submitted to the American Society of Civil Engineers Hydraulics Division Journal. To obtain the maximum disturbed dimensions of the scour hole, tests are continuing in which the bed material suspended in the plume of the jet is removed.

For additional information contact Fred W. Blaisdell, Research Leader, SEA-AR, USDA, St. Anthony Falls Hydraulic Laboratory, Third Avenue SE at Mississippi River, Minneapolis, Minnesota 55414.

MINNESOTA

The following research is being conducted at the North Central Soil Conservation Research Laboratory at Morris, Minnesota.

- 1. Hydrological, soil, and water quality conditions were monitored and data collected for three years on a forested watershed, and for five years on an agricultural watershed. Two of the five years resulted in no runoff events on the agricultural watershed because of drought conditions. This watershed was closed out in the fall of 1979 and data is currently being analyzed.
- 2. Cropped buffer strips on a 4 percent slope reduced runoff and total solids transported from a feedlot by 67 and 79 percent, respectively. TN and TP were reduced by an average of 84 and 79 percent, respectively. NH4-N and PO4-N were similarly reduced but average NO3-N in the runoff increased because some NO3-N was gained from two cropping treatments, sorghum-sudangrass and oat buffer strips. During two years of rainulator tests, the number of coliform organisms in the runoff water was reduced after runoff passed through the vegetated buffer strips. Buffer strip lengths of 36 m appear to be sufficient to reduce to acceptable levels concentrations of both nutrients and microorganisms in feedlot runoff from summer rainstorms on feedlot areas of the size tested.
- 3. A feedlot evaluation computer model was developed to provide a uniform, systematic method for evaluating the potential pollution hazard posed by open feedlots anywhere in the state of Minnesota. The purpose of the method is to provide a reasonably uniform and equitable means of dispensing public funds for pollution abatement based on the severity of the problem posed by each individual feedlot. The model has been adopted for use in Minnesota by the ASCS, Soil Conservation Service, Soil and Water Conservation Board and the Minnesota Pollution Control Agency.
- 4. Soil-particle detachment and transport largely depends on the particle-size distribution, density, and degree of aggregation of the matrix soil. Particles in the silt-size range erode more easily than clay or sand-size particles. Eroded material can generally be classified into two main-size categories, depending upon the matrix soil textural classification. Density of soil aggregates averages only about two-thirds or less that of primary particles and varies inversely with the amount of silt in a soil. Sediment particle size is also affected by the percentage of land slope, percent vegetative cover, and type of tillage.

Soils which initially are more than 50 percent sand or clay usually produce sediment with particles larger than 50 μm in size. High clay content soil produces much sediment with particles larger than 1000 μm . Soils that are initially more than 35 percent silt usually produce sediment in the silt size range from 2 to 50 m, with most particles ranging in size from 20 to 35 μm .

- 5. A microrelief profilimeter has been built and tested to automatically scan points on a 1 cm x 5 cm grid spacing to measure soil surface elevation. The platform holding the pins is microprocessor controlled and is capable of measuring over 300 surface elevations in less than one minute with a vertical resolution of 1 mm over a 25 cm range. The entire apparatus is light enough to be handled in the field by two persons. It is also battery operated for remote use, and the data are recorded on magnetic cassettes for easy output on a computer controlled plotter. A rainfall simulator-infiltrometer has also been built and tested. simulator consists of four modules which cover an area of 24 ft2. The rain is applied continuously through a series of needles rather than spray nozzles. The simulator allows for a wide range of intensities, from near zero to approximately 20 cm/hr. Irop size can also be controlled using air pressure to more closely simulate actual conditions. The entire unit is mounted on a pickup-towed trailer and, as such, can be used at remote field sites.
- 6. A rainulator was used to apply known amounts of rainfall energy on 8 plots, 13.3 feet (4.1 m) by 35 feet (10.7 m) on which a history of wheel traffic had been established. Standard runoff collection procedures were modified to separate erosion and runoff in the wheel track from that occurring in the non-tracked area. The wheel tracks, while comprising only 22 percent of the total plot area, produced 33 percent of the runoff and 50 percent of the soil loss originating in the plot. The soil surface sealed more rapidly and soil loss rates equilibrated in less time in the wheel tracks than in the non-tracked area. Detailed aggregate analyses of the matrix soil and sediment indicated that, while the wheel tracks contained larger aggregates, these aggregates were less water stable than those in the non-tracked area. Wheel traffic increased the bulk density and decreased the porosity of the surface soil to a depth of about 12 inches (30 cm.)
- 7. Soil loss was estimated by townships using the USLE for 38 counties in Minnesota for a variety of farming systems. Factors were derived using soils information derived from the SCS Conservation Needs Inventory, crop information derived from SRS Agricultural Statistics, land use information from the Land Management Information Center, and other necessary information from SCS sources. It was found that existing soil erosion exceeded the tolerable limit on over 70 of the 675 townships investigated. The effect of alter-

native cropping sequences, engineering practices, and tillage practices was also investigated. It was found that conservation tillage practices alone would control soil erosion on all but 16 townships. Average annual sediment yields were also estimated for 23 watersheds ranging in size from 262 to 386,000 square kilometers. Sediment yields ranged from under 50 kg/ha in the north to over 560 kg/ha in the southeast. Using the erosion and sediment yield data, a simple sediment routing technique was developed to prioritize upland sediment sources on 10 watersheds. It was estimated that from 41 to 68 percent of the basin yields resulted from only 25 percent of the area. This type of information prioritizes sediment producing areas so that initiation of conservation practices can be accomplished in the most effective manner.

For additional information contact R. F. Holt, USDA-SEA, Morris, MN 56267.

MISSISSIPPI

Research activities at the USDA Sedimentation Laboratory in Oxford, Mississippi include the following:

- Research in cooperation with the North Mississippi Experiment Station on no-till and reduced-till systems for cotton, corn, and soybeans is continuing. Use of cultivation for weed control in no-till planted corn without excessive erosion was reported previously. The 2-year average of tests using the same system for soybeans resulted in 3.3 t/a soil loss, which is greater than for corn. However, the results from 2 years are not conclusive. Annual and cropstage C-factors for these no-till and reduced-till systems are being computed for publication and use in the USLE. First year results from no-till cotton showed a yield reduction; however, reduced-till cotton yield was almost as high as from conventional-till cotton. Both no-till and reduced-till cotton yielded as well as conventional-till cotton during the second year of the test.
- 2. The rainulator is being used to study the mechanics of erosion for slopes under 3 percent primarily to verify or adjust the factors in the USLE. Studies of slope-length on 0.2 percent slopes resulted in soil loss proportional to slope length to the power of m = 1.2 $\sin\theta^1/^3$ for slopes less than 10 percent. Studies of the effect of slope were made in 1978 but the data have not been fully analyzed. Other factors influencing soil loss on low slopes in these valley and river bottom soils that are intensively farmed include protection from raindrop impact by surface water layers.
- 3. Research in cooperation with the SCS on flatland watersheds in the Mississippi Delta is continuing. One pair of watersheds, 38.5 and 46.2 acres, is located on 0.2 percent graded slopes. One watershed is on Sharkey soil, the other on primarily Commerce soil; both are used for cotton production. The sediment yield is being used to verify the UCLE and to compute C-factors for cotton grown on nearly flat slopes. Two more pairs of small watersheds are being used to study the effect of different cotton tillage systems and natural vs. graded slopes on sediment yield. A 640-acre watershed is being used to determine sediment yield from typical Delta flatland watersheds. All of the watershed data are also being used to develop a simple field sediment yield model based on the USLE and sediment delivery ratios.
- 4. In cooperation with the Soil Conservation Service, four varieties of willow were planted in 1976 at the toe of eroded banks of a 120-foot wide dredged channel in northern Mississippi. In the first year, 60 percent of the plantings failed due to high water velocities, bank slides, and poor site conditions. The surviving willows are being observed for their long-term effect on stabilizing the stream banks. Additional plantings of willow, river birch, maiden cane rhizomes, and phragmites rhizomes were made in 1978 behind 5000 feet of newly constructed jacks and fences on Hotopha, Johnson and Peters Creeks in

Panola County near Oxford, MS. All of the maiden cane rhizomes were lost from one storm on May 5, 1978, a month after planting. Losses of willow, river birch and phragmites of 70, 63 and 50 percent, respectively, were attributed to high water velocities during the May 5 storm and to extremely dry weather that followed. Another vegetative study was implemented in cooperation with the SCS and the Corps of Engineers. Construction on both sides of a 1600-foot reach of Johnson Creek was begun in November, 1978 and completed June 20, 1979. The banks were finished to a 2:1 side slope. Various combinations of rip-rap, cellular blocks and vegetation were installed on 9 treatments along the reach. Measurements are being made to evaluate the hydraulic effects of the treatments and to determine the erosion resistance of the treatments. Also in 1979, various species of shrubs and trees were planted behind about 3000 feet of rip-rap dikes, jacks, and fences on Peters, Johnson and Hotopha Creeks in Panola County. During FY 1980, approximately 1800 feet of additional channel banks on Johnson and Goodwin Creeks are planned for addition to the existing project. These studies, which will be in channel bends, will consist of bank forming on 1:3 slopes with toe protection using various materials and techniques. The bank surface will be planted to various species and types of vegetation.

- 5. Instrumentation was installed on a small sediment detention reservoir (pond) to measure, on a storm basis, water and sediment inflow and outflow. Additional instruments are being installed to measure sediment concentrations and water temperatures at selected locations and depths within the water body. Data collection, scheduled to begin in the spring 1980, will provide information on the performance of fine sediments in small impoundments.
- 6. Amounts and distribution of sediment deposits in 12 small normally ponded reservoirs were studied and analyzed. In spite of wide variations in reservoir size, shape, and sediment inflow volume, most of the structures trapped over 80% of inflowing sediments. Only one, a very small pond-type structure, mad a lower trap efficiency. Fine sediments, generally less than 8 microns, were fairly evenly distributed throughout most of the reservoirs. Coarse sediments, sand size and larger, were usually concentrated at the upstream end of the reservoirs near the permanent pool elevation. Mean outflow concentrations did not exceed 300 ppm and essentially all outflowing sediments were fine material. This suggests that flow detention times were sufficiently long in all of these structures to permit settling of all but very fine sediment particles.
- 7. Collection of rainfall, runoff, and sediment data on a storm basis was continued on two small single cropped (cotton) watersheds in the Bear Creek Basin. Excessive rainfall, 40 inches during the first 6 months of the year, caused flooding of parts of the plots for several weeks in the winter and spring. Particle size analyses of soil samples from the watersheds were completed. Clay content in the top 8 inches of soil ranged from 10 to 35% and the sand content from 30 to 80%.

Particle size analyses of selected runoff samples showed that essentially no sand is leaving the watersheds. Clay content in the outflow ranged to 90% of the total sediment which indicates significant enrichment of fine particles as the soil is transported from the watersheds.

- 8. A set of 15 sediment samples from oxbow lakes in the Bear Creek Basin was used to evaluate recently developed, commercially available instruments for measuring the particle size and particle size distribution of sediment deposits. Particle size distributions were determined by four different procedures including the Sedigraph at Chickasha, OK, the Microtrac at Tucson, AZ, the Particle Data Analyzer and the conventional pipette procedure at Oxford, MS. While the study is not yet complete, the available data are being analyzed. An additional set of data is expected from a fifth instrument at the U.S. Army Cold Region Research Laboratory, Hanover, NH.
- 9. A laboratory test channel was modified to accommodate the hydraulic simulation of in-channel sediment traps similar to those being used by the SCS in channelization projects. Instrumentation has been installed. Testing is not yet complete. As a second effort, field evaluation of these traps has begun on Juniper Branch of Chicod Creek in North Carolina in a cooperative study with the SCS and the USGS. Samples have been obtained from six storms, but analysis of the data is not yet complete. Field data collection is continuing.
- 10. A process-oriented mathematical model has been developed describing the thermal, suspended sediment, and dissolved material processes in shallow, stratified impoundments. This model has been verified by data from Lake Chicot in Arkansas. In addition, 3-year data bases of physical, chemical and biological variables have been assembled from Wasp, Three-Mile, and Blue Lakes in Mississippi for further model verification.
- 11. In a cooperative study with the Wisconsin Department of Natural Resources sediment samples from 3 Wisconsin lakes, Honey, Redstone, and Black Otter, were analyzed for Cesium 137 content. The location of maximum cesium content in the sediment profiles was used to compute apparent sedimentation rates at various locations in the lakes. Data collected in 1964 and 1979 indicate that apparent sedimentation rates in these lakes vary in both time and locations. From 1954 to 1979 computed average annual rates range from .80 cm/yr at sites in Black Otter and Redstone to a maximum of 2.40 cm/yr at sites in Honey and Redstone. These data are providing a data base for management decisions in the operation of these and other lakes.
- 12. Particle size determinations and CS-137 analyses of 58 soil and sediment profiles from southwestern Wisconsin were completed. An additional 6 profiles from Allerton Lake were analyzed for CS-137. These data were collected for the purpose of evaluating the Cesium-137 method for determine soil erosion. Evaluation and interpretation of these data are incomplete.

- 13. Field data collection on the Bear Creek, Mississippi project, a cooperative research study with the Vicksburg District, U. S. Army Corps of Engineers, was completed in December, 1979. Large amounts of sediment and water quality data have been accumulated during the last 4 years from this 132 mi² delta watershed with numerous in-stream and off-stream lakes. Results have been reported quarterly and a final and more detailed report is being prepared. Additional study and evaluation of the data is being done as time permits.
- 14. Surveys of various components of the Bear Creek aquatic ecosystem were also completed, culminating three years of monthly data collections for major trophic levels. Aquatic life in Bear Creek on all levels has been affected adversely by runoff associated sediments and agricultural chemicals. Monthly collections for plankton showed strong population dependency upon runoff associated nutrients. Benthic production in lakes was usually limited to hardy species, able to cope with the deposited sediment load (up to 7.2 cm/yr). Benthos species diversity was low, indicating heavily stressed community structures. Coliform bacteria counts showed heavy animal and human contamination of the upper portion of the stream system. An aquatic and semi-aquatic plant survey by habitat was also concluded. A one-acre rotenone fish study on Mossy Lake, an off-stream lake, will allow comparisons between in-stream and isolated lakes. Physical and chemical parameters were collected with all samples. Detailed study and analyses of the data remains to be done.
- 15. In another cooperative study with the U. S. Army Corps of Engineers the collection of sediment and water quality data was continued in 1979 on Lake Chicot in Arkansas. Sediment and chemical loads entering, within, and leaving the lake were monitored on a daily basis. These data were combined with flow data to compute sediment and chemical budgets for the lake. The data are also being used in the verification of mathematical models for predicting sedimentation processes in reservoirs and impoundments.
- 16. Sampling of ecological parameters (benthos, plankton (nanno-and net), chlorophyll, coliform bacteria) and biochemical oxygen demand in Lake Chicot continued on a four-week basis. A subcontractor (University of Arkansas-Monticello) supplied monthly C-14 primary productivity Samples from several trophic levels (mainly fish) were measurements. analyzed for residual pesticides. Measurements of selected water quality and sediment parameters and flow characteristics were taken on a two week basis to aid in the ecological analysis. Accumulated data suggests a definite relationship between primary production and suspended sediments. Benthic organisms appear to be adversely affected in stream delta regions by deposited sediments. Surveys indicate an extreme imbalance of fish species in the lower lake (which has heavy sediment inflow), but preliminary testing results show residual pesticide levels to be low except for fishes four or five years old. project is to continue for another year.

- 17. Three years of runoff, sediment, and toxaphene yield data were summarized for a 15.6-ha Sharkey silty clay watershed in the Mississippi Delta and submitted for publication. This report, which includes information on toxaphene distribution coefficients, concentration frequency distributions, disappearance rates, and mode of transport, will be helpful in calibrating or testing chemical transport models.
- 18. Research was continued on the washoff of insecticides from plant canopy as functions of rainfall intensity and amount. This study is part of an on-going effort to model the movement of insecticides from plant canopy to soil and the subsequent transport in runoff and sediments.
- 19. A 250-ft. test channel with a flow capacity of up to 150 cfs. has been equipped for making river-scale studies of sediment transport with better control of the independent variables than can be maintained in actual rivers. Instruments include continuous sediment load measuring devices, and automated depth and bed profile recorders. All data collected will be sent directly from experiment to computer for analysis concurrent with the experiment. Information obtained will be used in establishing better criteria for stable channel designs.
- 20. A 100-ft. flume with an 18 cfs maximum flow capacity has been equipped for experimenting with alluvial channel resistance coefficients in unsteady flows. The experiments in this flume will be entirely controlled by a totally dedicated computer, which will impose a preprogrammed unsteady flow during an experiment, and concurrently acquire and analyze the data from the experiment. Instrumentation includes depth and discharge controls, and a series of water depth, sand depth, discharge, and temperature measuring instruments.
- 21. Computer codes have been written to investigate patterns of localized scour around channel transitions. The schemes use known-discharge, finite element techniques and have been used so far to simulate natural backfilling of dredged trenches and flow patterns around confluences of alluvial streams. Results of preliminary validation runs using some available data are satisfactory.
- 22. A report on stochastic approaches to suspended-sediment transport was prepared for the ASCE Task Committee on Stochastic Hydraulics. A detailed evaluation of existing stochastic techniques for predicting turbulent dispersion of suspended sediment was carried out. The capabilities of these techniques along with their limitations were examined, and suggestions for their extension to complex cases of practical interest were given.
- 23. Hydraulic-similitude modeling of low-drop channel grade control structures is continuing. A low-drop structure is here defined as one in which the physical drop is equal to or less than the upstream approach specific head. Tests were conducted at flows ranging from 2000 to 4000 cfs (prototype) and in all cases an undulating hydraulic jump

(stationary wave) developed over the drop and persisted on downstream. One method to destroy the stationary wave and its detrimental effects to the downstream channel is to place a vertical baffle plate or pier in the flow. Model tests are being conducted to determine the geometry of the scour hole developed for different sizes of baffle plates and flow rates. A generalized, hydraulic similitude study is in progress to develop generalized design criteria for low-drop channel grade control structures using the baffle plate.

- 24. Evaluation of the distribution and significance of the valley-fill stratigraphic units has continued. Additional wood samples contained within or at the contacts of the valley-fill units have been collected and dated by C analysis. Two dominant modes at circa 10,000 C years Before Present (BP) and at circa 1000 C years BP contain 42% and 46% of the wood samples, respectively. In addition, five samples form a mode at circa 5000 C years BP and four samples have ages greater than 40,000 C years BP. The three youngest modes comprise a frequency distribution which is in agreement with Holocene paleoclimatic interpretation. This apparent paleoclimatic control of the valley-fill stratigraphic units enhances the predictive capabilities of the overall bank stability study. The utility of such capabilities is based upon the previously reported association between bank failure mode and valley-fill stratigraphic unit.
- 25. Photogrammetric interpretation of ASCS aerial photographs has been initiated. Channel widths and depths have been measured for Johnson Creek for the years 1937, 1944, 1957 and 1975. Approximately 8 feet of thalweg lowering have occurred in some reaches since 1944 due primarily to headcut migration, and this amount of bed degradation has caused many, if not most, of the present bank instability problems. Channel widths downstream of the headcut on Johnson Creek are highly variable and were not significantly related to channel depth or to longitudinal location. Channel widths and depths are significantly related upstream of the headcut. These results illustrate the disruptive influence of headcuts on "equilibrium" channelized flow conditions, i.e., headcuts are local areas of excessive energy expenditure which have formed at least partly in response to extrinsic conditions.
- 26. The interrill erodibilities of seven additional soils were evaluated during 1979, using measurements of soil loss from row sideslopes during simulated rainstorms at four rain intensities. Of the 16 soils studied thus far, erosion rates were the lowest for the well-aggregated, fine-textured soils of the Mississippi Blackland Prairie. Mississippi Delta silty clay and sandy loam soils were also of low erodibility. The silt loams and another sandy loam were moderately to highly erodible. The interrill erodibilities for soils tested in a bare, worked-up condition have differed by a factor of nearly 7 from the least to the most erodible. The size distributions of eroded sediment have been determined for all soils that were tested during erodibility research. Generally, the sediment from the sandy loam soils was sandy loam sized, though slightly coarser than the primary particles of the

- soils. The sediment from the silt loam soils was generally considerably coarser than the primary particles of the soils, though still silt loam sized for all soils except one. However, the sediment from the fine-textured clay and silty clay soils was much coarser in texture than the primary particles of these soils themselves, such that their sediment size distributions were those of sandy clay loams or sandy loams. The sediment from the finest textured soils was almost as coarse as that from the sandy loam soils because so much of it was in the form of large aggregates. Sediment size is a major factor that influences the transportability of eroded sediment, greatly affecting whether it will be transported and how easily it can be trapped by deposition in filter strips or sediment traps.
- 27. Research was completed on the effect of furrow slope, runoff rate, and sediment size on the capacity of concentrated flow to transport sediment sizes averaging 77, 151, 302, and 603 µm along crop row furrows. For this coarse sediment, nearly a hundred times more sediment could be transported at 1% than at 0.2% slope, nearly a thousand times more at 2½% than at 0.2%, and much over a thousand times at 5% than at 0.2%. As flow rate doubled, transport capacity generally doubled to tripled. Transport capacity increased as sediment size decreased. These results show that the amount of sediment movement on flatland fields will be greatly affected by the sediment size, by the flow rate as influenced by rain intensity and furrow length, and especially by the slope of the furrow along which the runoff is flowing.
- 28. In <u>situ</u> measurements of hydraulic conductivity were completed on Grenada (fragiudalf) soils. The drainage method for computing conductivities was found to be inadequate for soils with genetic pans or impeding layers. The evaporative method using the zero-flux plane as a lower boundary yielded useful data. Significant differences were noted between in <u>situ</u> measured hydraulic conductivities and those obtained from laboratory analyses using the Brooks-Corey relationships.
- 29. Construction of supercritical flumes for streamflow/sediment sampling is nearly complete. Nine of fourteen structures are finished with the remaining five in different stages of completion. Installation of instrumentation is underway at the completed sites. The instrumentation/electronics packages being installed include water level recorders for headwater and tailwater depths, a Chickasha pumped sediment sampler, a Dynatrol density cell, a recording raingage, thermistors to measure water, air temperature, and soil temperature. At several sites, ground level raingages are being installed in addition to the regular raingage. A central climatological site in the watershed measures solar radiation, relative humidity, barometric pressure, wind speed and direction, and pan evaporation. The data from most of these sites are transmitted back to a receiving computer at the laboratory by VHF radio telemetry. This gives access to the data on a nearly real time basis. Other data types being collected in the watershed include soil moisture, crop growth data such as canopy height and density, farm pond water levels and channel section profiles. The major use of the data will be

testing a comprehensive sediment transport model under development at the laboratory and reported in another note. Several related projects are also using the data including projects on channel stability, modeling of subsurface movement of water, and development of a crop growth module for use with the erosion model.

- 30. Several sediment-transport formulas were examined with reference to extensive field and laboratory data. The Yang formula gave the best estimates for streams carrying fine to coarse sands. The Laursen formula worked satisfactorily in small channels carrying silts and very fine sands. The Yalin formula was found adequate to predict capacity of overland flows carrying particles with sizes and densities typical of field situations.
- 31. A sediment routing model was developed that incorporates the effect of sediment-size gradation on stream carrying capacity and on bed evolution processes. The model permits simulation of bed armoring and streamwise sorting of bed material. Simulations of field data from Pigeon Roost Creek, Mississippi, East Fork River, Wyoming, and San Luis Valley Canal, Colorado, gave satisfactory results.

For additional information contact D.G. DeCoursey at the USDA Sedimentation Laboratory, P.O. Box 1157, Oxford, Mississippi 38655.

MISSOURI

1. Trap efficiency research by the SEA Watershed Research Unit on three central Missouri reservoirs was continued through 1979. This research included the measurement of inflow and outflow of sediment to determine trap efficiency on a storm basis. To improve the quality of water stored in small reservoirs, a bottom-withdrawal spillway is being studied to see what effect it has on the water quality in and downstream from two reservoirs. This spillway is expected to lower the trap efficiency because it eliminates the "dead" storage below the spillway intake which, in turn, reduces the detention time of storm runoff since density currents are discharged as soon as they reach the lowest point in the reservoir. As an example of the effect this spillway has on water quality, the phosphorus discharged from the spillway was compared to that stored in the reservoir. For one reservoir, the ortho-P discharged was 1.5 times greater than that stored, nitrate-N was 1.4 times greater, and ammonium-N was 1.3 times greater. For the other reservoir, ortho-P was 7.4 times greater, nitrate-N was 1.3 times greater, and ammonium-N was 1.9 times greater in the outflow than that stored in the reservoir. Sediment was likewise greater in the outflow than in the stored water. These trends should reduce the problems of sedimentation and eutrophication in reservoirs equipped with the bottom-withdrawal spillway.

For additional information contact Carroll R. Amerman, Watershed Research Unit, 207 Business Loop 70 East, Columbia, Missouri 65201.

NEBRASKA

1. Resurvey of actively eroding channel headscarps (15-20 ft. high) in 20 sq. mile Dry Creek Basin, Frontier & Lincoln Counties, Nebraska show that some have moved upstream more than 1000 feet since 1951, with appreciable channel filling at the original scarp location. Further study of this well-monumented drainage area is expected to yield considerable information on sediment delivery mechanisms and optimum grade control treatments.

For additional information contact Carroll R. Amerman, Watershed Research Unit, 207 Business Loop 70 East, Columbia, Missouri 65201.

NEBRASKA

Research at Lincoln, Nebraska pertinent to research and erosion is conducted on two farms in Stanton County, 100 and 112 miles north of Lincoln. These studies are on Nora and Crofton soils, typical of the lands where undulating topography and slopes are such that terraces cannot be installed and farmed with reasonable effort. Small areas of these lands often contribute major sediment production within a watershed and are of serious continuing concern in the Missouri Valley Loess and Table Land areas.

1. Sediment and water control basins (discontinuous terraces) have been constructed with riser inlets and underground pipe outlets. The basins impound runoff and discharges are controlled through the riser inlets. The basins have selected designs for 2-, 5-, and 10-year frequency storms downslope on each subwatershed drainway. The basins are on terrace spacing and permit parallel row-crop tillage. Runoff in excess of the detention storage and discharge capacity of the underground pipe is discharged as overland flow on the adjacent ridge.

Each instrumented basins has a water stage recorder to provide a runoff hydrograph of the discharge through a calibrated riser and an orifice plate. Programmed samplers take discrete samples from the pipe discharges at selected time intervals during runoff.

Construction of some basins were completed in 1978 and the balance in the spring of 1979. Despite soil disturbance and loss of residue by construction which reduce infiltration, no runoff event provided more than half-capacity impoundment in any basin. Some basins have had little impoundment with any event to date. Appreciable transported solids have been found only in samples from the initial discharge and prior to impoundment in the basin. Impoundment permits deposition in the basin. These minimal soil losses on runoff compare with losses of up to 20 tons per acre inch of runoff measured from unprotected drainways in these fields prior to installation of the basins. Added protection from crop residues under conservation tillage is expected to decrease both soil movement and runoff.

Farmability of the fields have been greatly improved with savings in fuel. Only the backslope of each structure is lost to cultivation and this is offset by the elimination of unneeded waterways.

For additional information contact LaVerne E. Stetson, Agricultural Engineering Department, University of Nebraska, Lincoln, NE 68583.

OHIO REGION

SCIENCE AND EDUCATION ADMINISTRATION

Research Activities at the U. S. Department of Agriculture-SEA-AR in Coshocton, Ohio include the following:

- 1. Erosion plots have been established at 2 mine sites in Ohio. They are sited on 4 different uniform slopes ranging from 9 to 30 percent. The plot lengths range from about 12 feet to 290 feet. The lengths of the plots are distributed on these slopes with the shorter plots on the steeper slopes. Nine plots have reclamation treatments of mulch rates and depths of topsoil. Data will be collected for practical use to verify and/or improve erosion models for surface mine planning.
- 2. A flow proportional sampler was developed for use on the erosion plots in item 1. The objectives for development included the necessity for the use of readily available materials and rapid assembly, and a minimum of special efforts to install. The sampler catches all the runoff and diverts the flow on a timed basis. Proportionality is a function of only time. Tests indicate that the sampler is very accurate for the range of flows expected from standard sized plots.
- 3. Sediment data have been collected for 2 watersheds that have experienced surface mining. Analysis is underway to determine the impacts of mining on sediment yield.

For additional information contact James V. Bonta, U. S. Department of Agriculture-SEA-AR, P. O. Box 478, State Route 621, Coshocton, Ohio 43812.

OKLAHOMA

Research activities at the <u>SOUTHERN PLAINS WATERSHED AND WATER QUALITY</u> LABORATORY, Durant and Chickasha, Oklahoma, include:

- An investigation of the effects of varying land uses on amount of runoff and sediment discharges. Amounts of runoff and sediment discharges for 1979 are being computed for watersheds at El Reno and Woodward, Oklahoma. At El Reno, eight watersheds were studied. Four watersheds were in wheat, however, severe heat problems precluded grain harvest and they were grazed out. These four watersheds were moldboard plowed in early June. Two watersheds were seeded to sorghum while the other two remained fallow. Sorghum was harvested in mid July for hay. The four other watersheds remained in native grass and were grazed after June 29. One watershed was burned on March 30. Fertilizer, 50 lbs/ac of N, was applied to two watersheds during early April. Grazing was limited on three of the watersheds to maintain high quality forage. Considerable runoff occurred during the year. At Woodward, Oklahoma, four watersheds were continued in range. Two watersheds remained in grass and were grazed at varying rates throughout the year. The other two watersheds were moldboard plowed in June and planted to wheat in early November. At Bushland, Texas, three graded terraced cropped watersheds and two small grass plots were sampled for runoff, sediment yield and water quality.
- 2. An investigation of the techniques of particle size analysis of watershed soils, material in transport from the watershed, and deposited sediments is being conducted. Particle size analysis of suspended sediment samples from two Fort Reno watersheds indicated that fine particles are aggregated under natural conditions. Particles smaller than 25 microns were aggregated in samples from higher flows with righer sediment concentrations. In lower flows with lower concentrations and generally with finer size distributions, only the particles smaller than 10 microns were aggregated. Aggregation appears to be related to sample concentration and/or particle size distribution. A comparison of methods for deposited sediments (D₅₀ = 10 microns or less) is being conducted.
- 3. An investigation into the methods and procedures to evaluate and develop sediment yield estimates. An average EI distribution curve from 4 raingages on the cropland watersheds was compared to the EI distribution curve in handbook 537. The curves differed by less than 1% for November-February. The curve was higher than the curve in handbook 537 for March-June and was lower for July-October. Maximum difference between the two curves was 13% at the end of May. The change in distribution lowered the C factor 7.5% on the cotton watersheds and 6% on the wheat watersheds. Annual EI for the 10 year period

averaged 205 compared to 240 from handbook 537. The two factors combined resulted in a reduction in estimated erosion of 20% compared to the handbook values.

- 4. An investigation of radioactive cesium as a possible tool to distinguish sheet and rill erosion from gully erosion was conducted. The results were inconclusive. The cesium content of the suspended sediment from the gully watershed was higher than that from the watershed where sheet and rill erosion dominates even though the reverse was true for the sampled surface soils on the watersheds. If the method is not useable on small size single source watersheds, it probably would not be suitable on larger watersheds with more diverse and complex erosional processes.
- 5. An investigation of 18 empirical, lumped-parameter sediment yield models for watersheds in the Southern Plains is being conducted. Predictions with these are being compared to measured yield data for the larger Southern Plains watersheds. Comparison of these models may indicate a useable model exists and the study would bring to light pertinent, otherwise overlooked, variables.
- 6. An investigation of the adoption of a distributed parameter, deterministic watershed sediment yield model for use in the Southern Plains. Reservoir trap efficiencies have been determined on an individual storm basis for a floodwater retarding reservoir having sediment measuring stations on the main inflow channel and the outflow. Trap efficiencies were roughly inversely related to the volume of main channel water inflow and ranged from 100 percent for small inflow events that did not spill to 70 percent for a large flow event.

For additional information contact J. Roger McHenry, Director, USDA-SEA-Southern Plains Watershed and Water Quality Lab, P.O. Box 1430, Durant, OK 74701.

OREGON

Research activities at the Columbia Plateau Conservation Research Center, Pendleton, Oregon include the following:

- Runoff and soil erosion from a permanent site in a wheat-pea rotation is now in its third season of operation. The site is located nine miles east of the Columbia Plateau Conservation Research Center at an elevation of 2400 feet. Average annual precipitation is approximately 22 inches. The site consists of six plots each 110 X 13.3 feet and associated runoff and sediment sampling equipment and instrumentation. Two of the plots are in permanent fallow, two plots have winter wheat followed by peas or spring wheat and the two remaining plots have peas or spring wheat followed by winter wheat. Tillage and simulated planting operations are made on the fallow plots at the same time they are completed on the plots for the other treatment combinations. Meteorological variables are also recorded continuously at the site. Numerous runoff and erosion events during the 1977-78 and 1979-80 winter seasons. No runoff occurred during the 1978-79 season. Site improvements have been the installation of additional water level recorders on each flume to obtain a better definition of the runoff hydrographs. A shallow seismic survey completed in late summer indicated that one of the important factors in generating surface runoff is the existence of a dense and probably impermeable layer which underlies the site. In addition, variations in seismic velocities in the near surface layer indicate areas of high density and low permeability, which are spatially discontinuous and must also generate surface runoff. Marked color changes, bulk density and texture all three show this layer to occur at 30 to 40 cm. An expanded network of piezometers for monitoring underground flow was installed; the site has been equipped with a standard weather bureau shelter housing a mechanical hygrothermograph and maximum-minimum thermometers.
- 2. To monitor wintertime soil erosion in the Pacific Northwest, plots must be instrumented after the last fall operation. Such plots must also be set up for servicing from an all weather road. Thus borders must be installed quickly without trampling and vehicular traffic in farm fields. A prototype border planter was developed to be hand carried into the field, easily assembled in field at the top of the plot, and then pulled toward the edge of the field using a winch on a 3/4 ton pickup. The border planter was made to install vinyl impregnanted canvas into which nylon staves were sewn. These borders are light and sturdy, and can be reused. This prototype border machine performed well in dry soil irrespective of residue amounts present; in wet soil only small amounts of surface residue could be negotiated. A second lighter prototype is to be tested for performance in wet soils with large amounts of residue present.

3. A new and different program of soil erosion research in northeastern Oregon was initiated in September of 1979. Fourteen plots, each 3 X 18 meters were installed using the border planter after fall tillage and planting operations were complete at 5 sites. The sites are located in Wasco, Gilliam, Morrow, Sherman, and Umatilla counties, Oregon. All except in Umatilla County were winter wheat after fallow; winter wheat was planted after wheat at this Umatilla County site. These sites represent the variety of physical and climatic variability found on the Columbia Plateau. Each site is instrumented to continuously record air temperature, soil temperature, relative humidity, and precipitation; each plot is equipped with a holding tank containing a water stage recorder so that runoff amounts and rates can be determined. In addition, a frost tube is located at each site and snow water equivalent on each plot is determined each week. After each runoff event water samples are collected from each holding tank and analyzed for sediment concentration. Numerous runoff and erosion events have been observed this year. The plots are removed in April and re-installed at different sites each fall after fall tillage is completed. Preliminary analysis of this years data indicates that frozen soils and snowmelt were causative factors in 12 out of the 15 observed runoff-erosion events. The vinyl impregnated canvas borders performed as well as or better than sheet metal borders used at the permanent erosion site.

For additional information contact John F. Zuzel or R. R. Allmaras, Columbia Plateau Conservation Research Center, USDA-SEA-AR, P. O. Box 370, Pendleton, OR 97801

TEXAS

Research activities at the Grassland, Soil and Water Research Laboratory at Temple, Texas include the following:

- 1. A new project, Conservation-Tillage Systems for Dryland Crop Production in the Texas Blackland Prairie, was initiated. A new planter was designed, fabricated, and tested by operating in oat stubble, sorghum stubble, cotton stubble, and tilled soil while planting forage sorghum, grain sorghum, cotton, and wheat. Three comparison watersheds which had been treated by preparing flattopped wide beds were altered by forming ridged wide beds for 1980 corn production. Controlled traffic was used with all wide-bed field operations. Plant populations, surface residue, flow, and sediment were measured for the watersheds. Control of johnsongrass was a problem without fallow tillage. Development was started on a sweep herbicide incorporator and a between-rows rope type herbicide applicator for weed and grass control in residue covered fields.
- 2. The MUSLE was linked to the CREAMS (Chemical Runoff and Erosion from Agricultural Management Systems) hydrology model option 1 for testing. The runoff-sediment model was applied to 57 basins across the U.S. Basin characteristics, land use, and climatic conditions ranged widely. Some of the input data was estimated because SCS is still assembling land use and soils information for a few of the basins. However, the present results are quite encouraging. The R² value obtained by comparing the measured and predicted average annual sediment yields for the 57 basins is 0.83.
- 3. A model was conceptualized for simulating upland soil erosion. The dynamic model simultaneously solves equations describing detachment by rainfall, and deposition, reentrainment, and degradation by concentrated flow. It allows a detailed description of topography, soils, vegetative cover, crop reside, and conditions caused by tillage. The model is in the early stages of testing. When the model is fully developed it will be combined with a sediment routing model to form an upland-channel erosion sedimentation model. The upland-channel model will be linked to a hydrology-nutrient-crop growth-tillage model for use in evaluating the effects of management strategies and determining soil loss-crop production relationships.

For additional information contact Clarence Richardson, Research Leader, USDA-SEA-AR, Southern Region, P. O. Box 748, Temple, TX 76501

WASHINGTON

The following research is being conducted by the Land Management and Water Conservation Research Unit at Pullman, Washington:

- 1. A portable, photographically recording rill meter is being used to measure soil loss from rills from selected field sites at the end of the erosion season. The purposes of the study are to determine (1) the effect of slope length and steepness on loss, and (2) the variation of soil loss across the climatic belts of eastern Washington and northern Idaho. The results from this study, initiated in 1973, will be used in developing a second generation adaptation to the Pacific Northwest of the Universal Soil Loss Equation.
- 2. Runoff plots have been installed on fields in eastern Washington on various crop treatments including conventional, reduced, and no-till seeded winter wheat, and various primary tillages of wheat stubble. The purposes are (1) to determine the effect of crop treatments on (a) runoff, (b) soil loss, and (c) nitrogen and phosphorous in runoff water; (2) determine the effect of slope length on relative magnitudes of sheet and rill erosion; (3) determine the effect of certain conservation practices on runoff and erosion; and (4) determine potential for residue harvesting for biomass conversion processes. Instrumentation includes frost depth meters to determine the effect of crop treatment on frost depth and subsequent runoff and erosion following periods of frozen soil.
- 3. A crop management factor evaluation model is being developed for use in the adaptation of the Universal Soil Loss Equation to the Pacific Northwest. The model will consider such factors as surface residue, tillage operations, vegetative cover, and soil moisture content prior to and during the winter erosion season.
- 4. A sediment transport and delivery rate study is being conducted on a 27.1 square mile watershed. A PS-69 automatic pump sampler, located near a USGS gaging station, is used to collect suspended sediment samples. Several channel cross sections are measured before and after the erosion season to estimate the amount of channel aggradation or degradation and are used with upland erosion and valley deposition measurements and estimates to calculate delivery ratio. Data from the study are also being used to determine sampling frequency requirements for streams in agricultural watersheds of the Palouse.

For additional information, contact Donald K. McCool, USDA, SEA, AR, Agricultural Engineering Department, 219 Smith Engineering Building, Wahington State University, Pullman, WA 99164.

LABORATORY AND OTHER RESEARCH ACTIVITIES

Water and Power Resources Service

The regular meeting of the Technical Committee to the Subcommittee on Sedimentation at the St. Anthony Falls Hydraulic Laboratury in St. Paul, Minnesota, was attended. In addition to regular business, the committee examined the first set of data on the Bedload-Sampler Calibration Research.

A representative of the Water and Power Resources Service attended the Spring Meeting of the American Geophysical Union which was held in Washington, D.C., the week of May 28, 1979. This representative also participated at the meeting of the AGU Committee on Erosion and Sedimentation which was held in conjunction with the AGU Spring Meeting.

The Fourth National Hydrotechnical Conference in Vancouver, Canada, was attended. The 2-day technical sessions were highlighted with a 1-day field trip to visit the hydraulic model of the Fraser River in Vancouver, and a river tour of the Lower Fraser River to observe training structures. Exceptional technical papers were presented in the field of sedimentation and river morphology.

A series of four lectures on "Water Related Sediment Problems" was presented to participants in the 1979 Water Systems Management Workshop held in Canver, Colorado, November 4-9, 1979.

A clay erosion test apparatus was designed to be built and used at the Grand Coulee Project to determine critical shear on 0.028 m 3 (1 ft 3) samples of clay. Undisturbed samples considered representative of varved and massive clays will be taken from the bottom of the Columbia River downstream of the dam. Results of the erosion tests will be used to help determine protective requirements for riverbank stabilization.

A 1:48 scale physical model of the combined spillway and outlet basin for Canyon Ferry Dam, Upper Missouri Basin Project, Montana, was used to study backflow of sediment from the river into the basin due to unbalanced flow and turbulence. Procedures for cleaning the basin by flow rather than using heavy equipment were also investigated.

A 1:36 scale model of McPhee Dam, spillway and stilling basin, Dolores River Project, Colorado, was used to study scour in the downstream river during spillway flow flipout.

A representative attended the regular meeting of the Technical Committee to the Subcommittee on Sedimentation in Knoxville, Tennessee. The meeting was highlighted with a 1-day field trip over the TVA coal strip mine reclamation programs near Knoxville.

APPENDIX

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This appendix is a computerized index of available sediment data from the National Water Data Exchange (NAWDEX). NAWDEX is an interagency program to facilitate the exchange of water data and to promote the standardization of water-data handling procedures. The participants in the NAWDEX program are those Federal, State, and local governmental organizations, and private organizations that collect and use water data.

NAWDEX maintains a "Master Water Data Index" which is a computerized index of available water data. The index contains information on sites for which water data are available, the location of these sites, the type of site, the data-collection organization, the types of data available, the major water-data parameters for which data are available, the frequency at which these parameters are measured, and the media in which the data are stored.

NAWDEX Definitions

Hydrologic Unit Codes—This an eight-digit numeric code identifying the site's location with reference to the areal definitions shown on the USGS State Hydrologic Unit Maps. The first two digits represent Water Resources Council regions (see Figure 1), the second two digits represent Water Resources Council subregions, the third two digits represent the National Water Data Network accounting units, and the fourth two digits are the cataloging units of the Catalog of Information on Water Data maintained by the Office of Water Data Coordination.

Station Name--The station name is assigned by the participating organization for the sites where it conducts water-data collection activities. It may contain both the name and location of the site.

State--This two-digit number is assigned to those sites which are physically located within the conterminous United States, Alaska, Hawaii, Puerto Rico, and Okinawa. It bears no relationship to the organization or office that is responsible for the operation of the sites (see Table 1).

<u>County</u>--This three-digit number is assigned to those sites which are physically located within a specific county. Census divisions are used, instead of counties, for Alaska (see Table 1).

<u>Site Type</u>—This two-character alphabetic code describes the type of water body subject to hydrologic data collection activities at the site, or the type of data collected at the site.

<u>Code</u>	Meaning
SW-Stream	A body of water flowing in a natural channel as distinct from a canal.
CN-Canal	An artificial waterway designed for navigation or for transporting water for municipal water supply, land irrigation, or drainage.

DR-Drain

A small artificial water-course designed to drain swampy areas or irrigated lands. Theoretically it is actually a small canal, but it is referred to as a "drain" in many localities.

ES-Estuarine Zone or Estuary The term "estuarine zone" means an environmental system consisting of an estuary and those transitional areas which are consistently influenced or effected by water from an estuary such as, but not limited to, salt marshes, coastal and intertidal areas, bays, harbors, lagoons, onshore water, and channels. The term "estuary" means that part of a river or stream, or other body of water having unimpaired connection with the open sea where the sea water is measurably diluted with fresh water derived from land drainage. The term includes estuary-type areas of the Great Lakes.

SS-Specific Source An artificial conduit or other conveyance where pollutants are discharged (from factories, sewage treatment plants, etc.) into a water body or aquifer.

OC-Ocean A site located in any of the world's oceans.

<u>Drainage Area</u>—is the area of the stream at the specific location of the site, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the site; it includes all closed basins, or noncontributing areas, within the total drainage area.

Basin Description—This numeric code may contain up to three digits. It is used to classify conditions in the drainage area of the data collection site. Code "3" (urban) and code "4" (natural) are mutually exclusive; one or the other will always be present but both will never be present for one specific site.

	Code	Meaning
	Regulation Diversion	The artificial manipulation of the flow of a stream. The taking of significant quantities of water from a stream or other body of water into a canal, pipe, or other conduit.
3	Urban	The situation where streamflow patterns at a site are effected significantly by urban development. The effect is considered to be significant when approximately 20-25 percent or more of the drainage area is covered by a dense road grid (indicating the presence of impermeable surfaces of roads, parking lots, and building roofs).
4	Natural	The opposite of "urban."

OW Begin Year--This four-digit number identifies the calendar year in which the acquisition of water quality data was first begun at a site, regardless of the types of water quality data that were collected. This date will never change even though water quality data collection may be deactivated and reactivated several times during a site's history.

OW End Year--This four-digit number identifies the calendar year in which all water quality data collection activity at a site was discontinued. If at a later date the collection of any of the water quality parameters is resumed, the former end date is deleted.

Data Collection Frequency Codes—These codes indicate the intervals of time for which records of water data are available. The meaning of the codes sited in the table below are self explanatory except for "continuous." Continuous records are those which are based upon recordings of data at intervals of 4 hours or less (6 or more times in a 24-hour period). Continuous records based upon data automatically recorded by a recording instrument are associated with frequency codes "I" or "J," while continuous records based upon manually recorded observations are associated with codes "C" or "D." Data collected at intervals greater than 4 hours but at least once daily fall under the codes designated as "daily." Data collection intervals that actually fall between those listed below are recorded under the next longer frequency.

Meaning	Code Year- Round	Code Seasonal	Code <u>1</u> / Eliminațed
Continuous-Recorder Instrument	I	J	L
Continuous Nonrecorder	С	D	${f T}$
Daily	0	P	2
Weekly	W	X	3
Bi-weekly	F	G	4
Monthly	М	N	5
Bi-monthly	H	K	6
Quarterly	Q	R	7
Semiannual (twice per year)	S		8
Annual (once per year)	Α		9
Other Periodic (less often than once per year) Seasonal (no time period specific	B ed)	Y	
Data collected at an irregular or unspecified frequency	r Z		
Unique (one-time measurement)	ប	•	
Eliminated Activity	E		

^{1/}The Eliminated Frequency Codes may be used to indicate that the collection of data for a single parameter, or data component, has been discontinued at a site and that data were being collected at the frequency indicated at the time of discontinuance.

Organization Code—This code is assigned by the NAWDEX Program Office and is the unique identifier for participating Federal and non-Federal organizations that actively collect and store water data. Non-Federal organizations include State, county, and municipal organizations as well as intergovernmental compacts, private organizations, universities, and any local organizations at other than county or municipal level (see Table 2).

Storage Media -- This one-character alphabetic code identifies the type of data storage.

Code	Meaning
P	PublishedIncludes methods of data dissemination such as documents (work sheets, etc.) which may be copied or communicated over the telephone, as well as formal publications.
С	Computer recognizable formatIncludes data stored in digital form in punched paper tapes, punched cards, magnetic tapes, magnetic disks, etc., that potentially can be transmitted to computer terminals and displayed on cathoderay tube screens, printed out on paper, or copied to another digital recording media.
М ,	MicrofilmIncludes data that has been recorded on microfilm or microfiche.
D	C and PComputer recognizable format and published.
E	C and MComputer recognizable format and microform.
F	C, P, and MComputer recognizable format, published, and microform.
G	M and PMicroform and published.

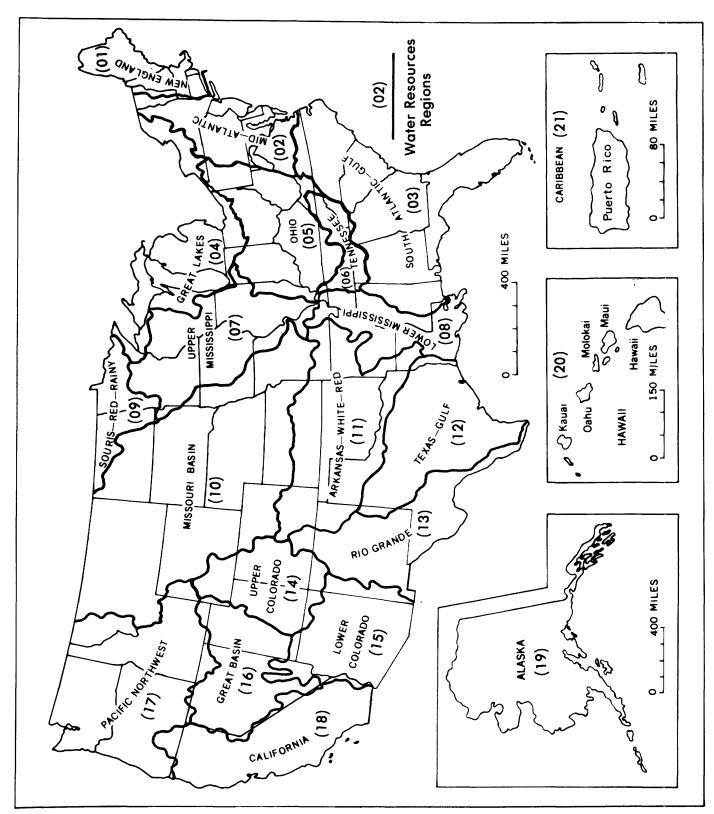


Figure 1.--Water Resources Regions of the United States.

Table 1.—Code numbers and abbreviations used for States (and other areas) and code numbers used for counties and independent cities

		STAT	TES AN	D THEIR CODES A	ND A	BBR	EVIATIONS			
Cod	de Abbr	. Code	Abbr.	Co	ode At	bbr.	Code	Abbr.	Code	Abbr.
Alabama 01	AL	Hawaii 15	ні	Massachusetts 2	25 N	ΛA	New Mexico 35	NM	South Daketa 46	SD
Alaska 02	2 AK	Idaho 16	ID	Michigan 2	26 N	ΜI	New York 36	NY	Tennessee 47	TN
Arizona 04	A Z	Illinois 17	IL	Minnesota	27 N	NN	North Carolina 37	NC	Texas 48	TX
Arkansas 05	5 AR	Indiana 18	IN	Mississippi 2	28 N	ИS	North Dakota 38	ND	Utah 49	UT
California 06	5 CA	Iowa 19	IA	Missouri	29 N	ON	Ohio 39	OH	Vermont 50	VT
Colorado 08	3 CO	Kansas 20	KS	Montana 3	30 N	ΤN	Oklahoma 40	OK	Virginia 51	VA
Connecticut 09	CT CT	Kentucky 21	KY	Nebraska 3	31 N	ΝB	Oregon 41	OR	Washington 53	WA
Delaware 10) DE	Louisiana 22	LA	Nevada 3	32 N	٧V	Pennsylvania 42	PA	West Virginia 54	wv
District of Columbia 11	DC	Maine 23	ME	New Hampshire 3	33 N	H	Rhode Island 44	RI	Wisconsin 55	WI
Florida 12	PL FL	Maryland 24	MD	New Jersey 3	34 N	٧J	South Carolina 45	SC	Wyoming 56	WY
Georgia 13	GA.	•		•					_	

STATES, COUNTIES, AND INDEPENDENT CITIES

[States are arranged alphabetically by their symbols; counties (census divisions) and independent cities are in numerical order within each State]

										.,-	
	*Alaska		Con.		con.		Con.	(on.		Con.
		125	Tuscaloosa	115	Pope	055	Napa	063 065	Kit Carson Lake	021 023	Collier Columbia
	Alabama	127	Walker	117	Prairie	057 059	Nevada Orange	067	La Plata	025	Dade
	County	129	Washington	119	Pulaski Randolph	061	Placet	069	Larimer	027	De Soto
001	Autauga	131 133	Wilcox Winston	121 123	St. Francis	063	Phimas	071	Las Animas	029	Dixie
003 005	Baldwin Barbour	133	winston	125	Saline	065	Riverside	073	Lincoln	031	Duval
003	Bibb		Arkansas	127	Scott	067	Sacramento	075	Logan	033	Escambia
009	Riount		County	129	Searcy	069	San Benito	077	Mesa	035	Flagler
011	Bullock	001	Arkansas	131	Sebastian	071	San Bernardino	079	Mineral	037	Franklin
013	Butler	003	Ashlev	133	Sevier	073	San Diego	081	Moffat	039	Gadaden
015	Calhoun	005	Baxter	135	Sharp	075	San Francisco	083	Montezuma	041	Gilchrist
017	Chambers	007	Benton	137	Stone	077	San Joaquin	085	Montrose	043	Glades
019	Cherokee	009	Boone	139	Union	079	San Luis Obispo	087	Morgan	045	Gulf
021	Chilton	011	Bradley	141	Van Buren	081	San Mateo	089	Otero	047	Hamilton
023	Choctaw	013	Calhoun	143	Washington	083	Santa Barbara	091	Ouray	049	Hardee
025	Clarke	015	Carroli	145	White	085	Santa Clara	093	Park	051 053	Hendry
027	Clay	017	Chicot	147	Woodruff	087	Santa Cruz	095 097	Phillips Pitkin	055	Hernando Highlands
029	Claburne	019	Clark	149	Yell	089 091	Shasta Sierra	097	Prowers	057	Hillsborough
031	Coffee	021 023	Clay		Arizona	093	Siskivou	101	Pueblo	059	Holmes
033 035	Coloert Conecuh	023	Cleburne Cleveland		County	095	Solano	103	Rio Blanco	061	Indian River
037	Conecun	023	Columbia	001	Apache	097	Sonoma	105	Rio Grande	063	Jackson
037	Covington	027	Conway	001	Cochise	099	Stanislaus	107	Routt	065	Jefferson
041	Crenshaw	031	Craighead	005	Coconino	101	Sutter	109	Saguache	067	Lafavette
043	Cullman	033	Crawford	007	Gila	103	Tehama	111	San Juan	069	Lake
045	Dale	035	Crittenden	009	Graham	105	Trinty	113	San Miguel	071	Lee
047	Dallas	037	Cross	011	Greenlee	107	Tulare	115	Sedgwick	073	Leon
049	De Kalb	039	Dallas	013	Maricopa	109	Tuolumne	117	Summit	075	Levy
051	Elmore	041	Desha	015	Mohave	111	Ventura	119	Teller	077	Liberty
053	Escambia	043	Drew	017	Navajo	113	Yolo	121	Washington	079	Madison
055	Etowah	045	Faulkner	019	Pima	115	Yuba	123	Weld	081	Manatee
057	Fayette	047	Franklin	021	Pinal		0-11-	125	Yuma	083 085	Marion Martin
059	Franklin	049 051	Fulton	023	Santa Cruz		Colorado County		Connecticut	087	Martin Monroe
06 l 063	Geneva Greene	051	Garland Grant	025 027	Yavapai Yuma	001	Adams		County	081	Nassau
065	Hale	055	Greene	027	1 UINS	003	Alamosa	001	Fairfield	091	Okaloosa
067	Heary	057	Hempstead		California	005	Ampahoe	003	Hartford	093	Okeechobee
069	Houston	059	Hot Spring		County	007	Archuleta	005	Litchfield	095	Orange
071	Jackson	061	Howard	001	Alameda	009	Baca	007	Middlesex	097	Osceola
073	Jefferson	063	Independence	003	Alpine	011	Bent	009	New Haven	099	Palm Beach
075	Lamar	065	lzard	005	Amador	013	Boulder	011	New London	101	Pasco
077	Lauderdale	067	Jackson	007	Butte	015	Chaffee	013	Tolland	103	Pinellas
079	Lawrence	069	Jefferson	009	Calaveras	017	Cheyenne	015	Windham	105 107	Polk Putnam
081 083	Loc	071	Johnson	011 013	Colusa Contra Costa	019 021	Clear Creek Concios		District of Columbia	101	rutnam St. Johns
085	Limestone Lowndes	073 075	Lafayette Lawrence	015	Del Norte	023	Costilla	001	Washington	111	St. Lucie
087	Macon	077	Lee	017	El Dorado	025	Crowley			113	Santa Rosa
089	Madison	079	Lincoln	019	Fresno	027	Custer		Deleware	115	Sarasota
091	Marengo	081	Little River	021	Glenn	029	Delta		County	117	Seminole
093	Marion	083	Logan	023	Humboldt	031	Denver	001	Kent	115	Sumter
095	Marshall	085	Lonoke	025	Imperial	033	Dolores	003	New Castle	121	Suwannee
097	Mobile	087	Madison	027	lnyo	035	Douglas	005	Sussex	123	Taylor
099	Monroe	089	Marion	029	Kern	037	Eagle			125	Union
101	Montgomery	091	Miller	031	Kings	039	Elbert		Florida	127	Volusia
103	Morgan	093	Mississippi	033	Lake	041	El Paso		County	12?	Wakulla
105	Perry	095	Monroe	035	Lassen	043	Fremont	001	Alachua	131	Walton
107 109	Pickens Pike	097 099	Montgomery	037	Los Angeles	045 047	Garfield	003	Baker	133	Washington
111	rike Randolph	101	Nevada Newton	039 041	Madera Masia	047	Gilpin Grand	005 007	Bay Bradford		Georgie
113	Randoipa Russell	103	Newton Ouachita	041	Marin Mariposa	051	Gunnison	007	Brevard		County
115	St. Clair	105	Perry	045	Mendocino	053	Hinsdale	011	Broward	001	Appling
117	Shelby	107	Phillips	047	Merced	055	Huerfano	013	Calhoug	00.	A tkinson
119	Sumter	109	Pike	049	Modoc	057	Jackson	015	Charlotte	00:	Bacon
121	Talladega	111	Poinsett	051	Mono	059	Jefferson	017	Citrus	00°	Baker
123	Tallapoosa	113	Polk	053	Monterey	061	Kiowa	019	Clay	000	Baldwin

^{*}At end of State listings.

0	o a.		Cos.		loa.		Con.	-	Coa.		Con.
053	Ellsworth	021	Boyle	205	Rowan	009	Essex	065	ingham	077	Lake of the Woods
055	Finney	023	Bracken	207	Russell	011	Franklin	067	lonia	079	Le Sueur
0.51	Ford	025	Breathitt	209	Scott	013	Hampden Hampshire	069 071	losco	081	Lincoln
059 061	Franklin Geary	027 029	Breckinridge Bullitt	211 213	Shelby Simpson	015 017	nampanare Middlesex	071	iron Isabella	083 085	Lyon McLeod
063	Gove	031	Butler	215	Spencer	019	Nantucket	075	Jackson	087	Mahnomen
065	Graham	033	Caldwell	217	Taylor	021	Norfolk	077	Kalamazoo	089	Marshall
067 069	Grant Gray	035 037	Calloway	219 221	Todd	023 025	Plymouth Suffolk	079 081	Kalkaska Kent	091	Martin
071	Greeley	039	Campbell Cartisle	223	Trigg Trimble	023	Worcester	083	Keweenaw	093 095	Meeker Mille Lac
073	Greenwood	041	Carroll	225	Union	02.		085	Lake	097	Morrison
075	Hamilton	043	Carter	227	Warren		Maryland	087	Lapcer	099	Mower
077 0 79	Harper Harvey	045 047	Casey Christian	229 231	Washington Wayne	001	County	089 091	Leelanau Lenawee	101	Murray
061	Haskail	049	Clark	233	Webster	003	Allegany Anne Arundel	093	Livingston	103 105	Nicollet Nobles
063	Hodgeman	051	Clay	235	Whitley	005	Baltimore	095	Luce	107	Norman
085	Jackson	053	Clinton	237	Wolfe	009	Calvert	097	Mackinac	109	Olmsted
067 069	Jefferson Jewell	055 057	Crittenden Cumberland	239	Woodford	011	Caroline	099 101	Macomb	111	Otter Tai'
091	Johnson Johnson	059	Daviess		Louisiana	013 015	Carroli Cecil	103	Manistee Marquette	113 115	Pennington Pine
093	Keerny	061	Edmonson		County	017	Charles	105	Mason	117	Pipestone
095	Kingman	063	Elliott	001	Acadia	019	Dorchester	107	Mecosta	119	Polk
097 099	Kiowa Labette	065 067	Estill Fayette	003 005	Allen	021 023	Frederick	109	Menominee	121	Pope
101	Lane	069	Fleming	003	Ascension Assumption	015	Garrett Harford	111	Midland Missaukee	123 125	Ramsey Red Lake
103	Leavenworth	071	Floyd	009	Avoyelles	027	Howard	115	Monroe	127	Redwood
105	Lincoln	073	Franklin	011	Beauregard	029	Kent	117	Montcalm	129	Renville
107 109	Linn Logan	075 077	Fulton Gallatin	013 015	Bienville Boories	031 033	Montgomery	119	Montmorency	131	Rice
111	Lyon	079	Gerrard	013	Bossier Caddo	035	Prince Georges Queen Annes	121 123	Muskegon Newaygo	133 135	Rock Roseau
113	McPherson	081	Grant	019	Calcasieu	037	St. Marys	125	Oakland	137	St. Louis
115	Marion	083	Graves	021	Caldwell	039	Somerset	127	Oceana	139	Scott
117 119	Marshall Mende	085 087	Grayson Green	023 025	Cameron Catahoula	041	Talbot	129	Ogernaw	141	Sherburn:
121	Miemi	069	Greenup	023	Claibourne	043 045	Washington Wicomico	131 133	Ontonagon Osceola	143 145	Sibley Stearns
123	Mitchell	091	Hancock	029	Concordia	047	Worcester	135	Oscoda	147	Steele
125	Montgomery	093	Hardin	031	De Soto		Independent City	137	Otsego	149	Stevens
127 129	Morris Morton	095 097	Harian Harrison	033 035	East Baton Rouge	510	Raltimore City	139	Ottawa	151	Swift
131	Nemaka	099	Hart	037	East Carroll East Feliciana		Maine	141 143	Presque Isle Roscommon	153 155	Todd Traverse
133	Neosho	101	Henderson	039	Evangetine		County	145	Saginaw	157	Wabasha
135	Ness	103	Henry	041	Franklin	001	Androscoggin	147	St. Clair	159	Wadena
137 139	Norton Omge	105 107	Hickman Hopkins	043 045	Grant Iberia	003 005	Aroostook Cumberland	149 151	St. Joseph Sanilac	161	Waseca
141	Osborne	109	Jackson	047	1berville	003	Franklin	153	Sanuac Schoolcraft	163 165	Washington Watonwan
143	Ottawa	111	jefferson	049	Jackson	009	Hancock	155	Shiawassee	167	Wilkin
145 147	Pawnee Phillips	113 115	Jessamine Johnson	051	Jefferson	011	Kennebec	157	Tuscola	169	Winona -
149	Pottawatomie	117	Kenton	053 055	Jefferson Davis Lafavette	013 015	Knox Lincoln	159 161	Van Buren Washtenaw	171 173	Wright Yellow Medicine
151	Pratt	119	Knott	057	Lafourche	017	Oxford	163	Wayne	1/3	Tenow weatcine
153	Rawlins	121	Knox	059	La Salle	019	Penobscot	165	Wexford		Missouri
155 157	Reno Republic	123 125	Larue Laurei	061 063	Lincoln Livingston	021 023	Piscataquis				County
159	Rice	127	Lawrence	065	Madison	025	Sagadahoc Somerset		Minnesota County	001 003	Adair Andrew
161	Riley	129	Lee	067	Morehouse	027	Waldo	001	Aitkin	905	Atchison
163 165	Rooks Rush	131	Leslie	069	Natchitoches	029	Washington	003	Anoka	007	Audrain
167	Russell	133 135	Lètcher Lewis	071 073	Orleans Ouachita	031	York	005 007	Becker Beltrami	009	Barry
169	Saline	137	Lincoln	075	Plaquemines		Michigan	009	Benton	011 013	Barton Bates
171	Scott	139	Livingston	077	Pointe Coupee		County	011	Big Stone	015	Benton
173 175	Sedgwick Seward	141 143	Logan Lyon	079 081	Rapides	001	Alcona	013	Blue Earth	017	Bollinger
177	Shawnee	145	McCracken	063	Red River Richland	003 005	Alger Allegan	015 017	Brown Carlton	019 021	Boone Buchanan
179	Sheridan	147	McCreary	085	Sabine	007	Alpena	019	Carver	021	Butler
181 183	Sherman Smith	149	McLean	067	St. Bernard	009	Antrim	021	Cass	025	Caldwell
185	Stafford	151 153	Madison Magoffin	089 091	St. Charles St. Helena	011 013	Arenac Baraga	023 025	Chippewa	027	Callaway
187	Stanton	155	Marion	093	St. James	015	Barry	023	Chisago Clay	029 031	Camden Cape Girardeau
1 89 191	Stevens Summer	157	Marshall	095	St. John The Baptist	017	Bay	029	Clearwater	033	Carroli
193	Thomas	159 161	Martin Mason	097	St. Landry	019	Benzie	031	Cook	035	Carter
195	Trego	163	Meade	099 101	St. Martin St. Mary	021 023	Berrien Branch	033 035	Cottonwood Crow Wing	037 039	Cass
197	Wabounsee	165	Menifee	103	St. Tammany	025	Calhoun	033	Dakota	039	Cedar Chariton
199	Wallace	167	Mercer	105	Tangipahoa	027	Cass	039	Dodge	043	Christian
203	Wichita	169 171	Metcalfe Monroe	107	Tensas	029	Charlevoix	041	Douglas	045	Clark
205	Wilton	173	Montgomery	109 111	Terrebonne Union	03 1 03 3	Cheboygan Chippewa	043 045	Faribault Fillmore	047 049	Clay Clinton
207	Woodson	175	Morgan	113	Vermilion	035	Clare	047	Freeborn	051	Cole
209	Wyandotte	177 179	Muhlenberg Nelson	115	Vernon	037	Clinton	049	Goodhue	053	Cooper
	Kentucky	181	Nicholas	117 119	Washington Webster	039	Crawford Delta	051	Grant	055	Crawford
	County	183	Ohio	121	West Baton Rouge	041 043	Derta Dickinson	053 055	Hennepin Houston	057 059	Dade Dallas
001 003	Adeig Allen	185	Oldham	123	West Carroll	045	Eaton	057	Hubbard	061	Daviess
005	Anderson	187 189	Owen Owaley	125 127	West Feliciana Winn	047	Emmet	059	lmnti	063	De Kalb
007	Bellard	191	Pendicton	127	WUIN	049 051	Genesee Gladwin	061 063	Itasca Jackson	065 067	Dent Douglas
009	Berren	193	Perry		Massechusetts	053	Gogebic	065	Kanabec	069	Douglas Dunklin
011 013	Both Boll	195 197	Pike Poweli	001	County	055	Grand Traverse	067	Kandiyohi	071	Franklin
015	Boons	199	Pulsaki	001	Rarnstable Berkshire	057 059	Gratiot Hillsdale	069 071	Kittson Koochiching	073 075	Gasconark
017	Bourbon	201	Robertson	005	Bristol	061	Houghton	073	Lac Qui Parle	073 077	Gentry Greene
019	Boyd	203	Rockcastle	007	Dukes	063	Huron	075	Lake	079	Grundy

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C	on.	•	Zoa.	C			PA.		on.	0	DA
	Banks Barrow	193 195			Cedar Cerro Gordo	007 009	Bear Lake Benewah	093 095	Kandali Kaox	963 965	Heafticks Heart
013 015	Bartow	197			Cherokee	011	Bingham	097	Lake	967	How wd
017	Den Hill	199		037	Chickasaw	013	Blaine	099	La Salle	069 071	Hunriegton Jack ve
	Berrien Bibb	201 205		039 041	Clarke Clay	015 017	Boise Bonner	101 103	Lawrence Lee	073	Jaspir
023	Bleckley	207	Monroe	043	Clayton	019	Bonneville	105	Livingston	075	Jay
025	Brantley	209	Montgomery	045 047	Clinton Crawford	021 023	Boundary Butte	107 109	Logan McDonough	077 079	Jefferson Jennissas
027 029	Brooks Bryan	211 213	Morgan Murray	049	Dellas	025	Cames	111	McHenry	061	John von
031	Bulloch	215	Muscogee	051	Devis	027	Canyon	113	McLean	063	Knor
033 035	Burke Butte	217 219	Newton Ocones	053 055	Decatur Delaware	029 031	Caribou Cassia	115 117	Macon Macoupin	065 087	Kosriúsko Lagryge
	Calhoun	221	Oglethorpe	057	Des Moines	033	Clark	119	Madison	089	Lake
•••	Camden	223	Paulding	059	Dickinson	035	Clearwater	121	Marion	091 093	La P THE
043 045	Candler Carroll	225 227	Peach Pickens	061 063	Dubuque Emmet	037 039	Custer Elmore	123 125	Marshall Mason	095	Mad '''e
047	Catoosa	229	Pierce	065	Fayette	041	Franklin	127	Massac	097	Marine
049	Charlton	231	Pike	067	Floyd	043	Fremont	129	Menerd Mercer	0 99 101	Marriell Marrie
051 053	Chatham Chattahoochee	233 235	Polk Polaski	069 071	Franklin Framont	045 047	Gem Gooding	131 133	Monroe	103	Mierri
055	Chattooga	237	Putnam	073	Greene	049	Idaho	135	Montgomery	105	Monme
057	Cherokee	239	Quitman	075	Grundy	051 053	Jefferson Jerome	137 139	Morgan Moultrie	107 109	Mos womery Mos ws
059 061	Clarke Cley	241 243	Rabun Randolph	077 079	Guthrie Hamilton	055	Kootensi	141	Ogle	111	Newson
063	Clayton	245	Richmond	081	Hancock	057	Letah	143	Peoria	113	Nob'n
065	Clinch	247	Rockdale Schley	083 085	Hardin Harrison	059 061	Lemhi Lewis	145 147	Perry Piatt	115 117	Ohir Orangs
067 069	Cobb Coffee	249 251	Screven	067	Henry	063	Lincoln	149	Pike	119	OM14
071	Colquitt	253	Seminole	089	Howard	065	Madison	151	Pope	121	Park*
073	Columbia Cook	255 257	Spelding Stephens	091 093	Humboldt Ida	067 069	Minidoka Nez Perce	153 155	Pulaski Putnam	123 125	Perr* Pike
075 077	Coweta	259	Stewart	095	lowa	071	Oneida	157	Randolph	127	Port **
079	Crawford	261	Sumter	097	Jackson	073	Owyhee	159	Richland	129	Poerv
061 063	Crisp Dade	263 265	Talbot Taliaferro	099 101	Jasper Jefferson	075 077	Payette Power	161 163	Rock Island St. Clair	131 133	Pula %i Putrem
065	Dawson	267	Tattnail	103	Johnson	079	Shoshone	165	Saline	135	Ran tolph
087	Decatur	269	Taylor	105	Jones	061	Teton	167	Sangamon	137	Ripl*v
089 091	De Kalb Dodge	271 273	Telfair Terrell	107 109	Keokuk Kossuth	063 065	Twin Falls Valley	169 171	Schuyler Scott	139 141	Rus' St. Joseph
093	Dooly	275	Thomas	iii	Lee	087	Washington	173	Shelby	143	Scott
09.5	Dougherty	277	Tift	113	Linn			175	Stark	145 147	Shel'w Sperver
097 099	Douglas Early	279 281	Toombs Towns	115 117	Louise Lucas		Minois County	177 179	Stephenson Tazewell	149	Starte
101	Echols	283	Treutien	119	Lyon	001	Adams	181	Union	151	Stev ten
103 105	Effingham Elbert	285 287	Troup Turner	121 123	Madison Mahaska	003 005	Alexander Bond	183 185	Vermilion Wabash	153 155	Sull ''en Swit redand
107	Emanuel	289	Twiggs	125	Marion	007	Boone	187	Warren	157	Tipy *canoe
109	Evans	291	Union	127	Marshall	009	Brown	189	Washington	159	Tipton
111 113	Fannin Fayette	293 295	Upson Walker	129 131	Mills Mitchell	011 013	Bureau Calhoun	191 193	Wayne White	161 163	Unira Van Arbumh
115	Floyd	297	Walton	133	Monona	015	Carroll	195	Whiteside	165	Veri-Mion
117	Forsyth	299	Ware	135	Monroe	017	Cass	197	Will	167 169	Vier Web - 4
119 121	Franklin Fulton	301 303	Warren Washington	137 139	Montgomery Muscatine	019 021	Champaign Christian	199 201	Williamson Winnebago	171	Watro
123	Gilmer	305	Wayne	141	O'Brien	023	Clark	203	Woodford	173	Warrick
125 127	Glascock Glynn	307 309	Webster Wheeler	143 145	Osceola	025 027	Clay Clinton		Indian	175 177	Was≒ington Way≈e
129	Gordon	311	White	147	Page Palo Alto	029	Coles		County	179	Well .
131	Grady	313	Whitfield	149	Plymouth	031	Cook	001	Adams	181	Whi ~
133 135	Greene Gwinnett	315 317	Wilcox Wilkes	151 153	Pocahontas Polk	033 035	Crawford Cumberland	003 005	Allen Bartholomew	183	Whi ***
137	Habersham	319	Wilkinson	155	Pottawattamie	037	De Kalb	007	Beaton		Kanwa
139	Hall	321	Worth	157	Poweshiek	039	De Witt	009	Blackford	001	County
141 143	Hancock Haralson		Hewaii	159 161	Ringgold Sac	041 043	Douglas Du Page	011 013	Boone Brown	003	Aller Andreson
145	Harris		County	163	Scott	045	Edgar	015	Carroll	005	Atc/Yeon
147 149	Hart Hoard	001 003	Hawaii Honolulu	165 167	Shelby Sioux	047	Edwards Effineham	017 019	Cass Clark	007 009	Barine Barine
151	Henry	005	Kalewao	169	Story	051	Fayette	021	Clay	011	Bourbon
153	Houston	007	Kauai	171	Tame	053	Ford	023	Clinton	013	Brown
155 157	Irwin Jackson	009	Maui	173 175	Taylor Union	055 057	Franklin Fulton	025 027	Crawford Daviess	015 017	Buting Chan
159	Jasper		lowa	177	Van Buren	059	Gallatin	029	Dearborn	019	Chartauqua
161	Jeff Davis		County	179	Wapello	061		031	Decatur	021 023	Chemice
163 165	Jefferson Jenkins	001 003	Adair Adams	181 183	Warren Washington	063 065	Grundy Hamilton	033 035	De Kalb Delaware	025	Chevenne Chry
167	Johnson	005	Allamakee	185	Wayne	067	Hancock	037	Dubois	027	Clay
169 171	Jones Lamez	007 009	Appanoose Audubon	187 189	Webster Winnebago	069 071	Hardin Henderson	039 041	Elkhart Fayette	029 031	Cloud Coff'v
173	Lanier	011	Augubon Benton	191	Winneshiek	071	Henry	043	Ployd	033	Con whiche
175	Laurens	013	Black Hawk	193	Woodbury	075	Iroquois	045	Fountain	035	Courtey
177 179	Lee Liberty	015 017	Boone Bremer	195 197	Worth Wright	077 079	Jackson Jasper	047 049	Franklin Fulton	037 039	Crarvford Dec vius
181	Lincoln	019	Buchanan	.,,	-	061	Jefferson	051	Gibeon	041	Dict-leson
183 185		021 023	Buena Vista Butler		Idaho County	063	Jersey In Devices	053	Grant	043 045	Dos tohan
187	Lumpkin	025	Calhoun	001	County Ada	085 087	Jo Daviess Johnson	055 057	Greene Hamilton	047	Dourles Edureds
189	McDuffie	027	Carroll	003	Adams	069	Kane	059	Hancock	049	Elk
191	Meintoch	029	Cass	005	Bannock	091	Kankakee	061	Harrison	051	EMir

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061	Con. Harrison	027	Coa. Coahoma	041	Con. Hill	103	Con. Keya Paha	095	Con. Hyde	075	Con. Renville
083	Heary	029	Copieh	043	Jefferson	105	Kimball	097	Iredell	077	Richlen ⁴
085 087	Hickory Holt	031 033	Covington De Soto	045 047	Judith Beein Lake	107 109	Knox Lencaster	099 101	Jackson Johnston	079 061	Rolette Sagent
089	Howard	035	Forrest	049	Lewis and Clark	111	Lincoln	103	Jones	083	Sheridar
091 093	Howell Iron	037 039	Franklin George	051 053	Liberty Lincoln	113 115	Logan Loup	105 107	Lee Lenoir	085 087	Sioux
096	Jackson	041	Greene	055	McCone	117	McPherson	109	Lincoln	089	Slope Stark
097	Jasper Jafferson	043	Grenada Hancock	057	Madison	119	Madison	111	McDowell	091	Stock
099 101	Johnson	045 047	Harrison	059 061	Meagher Mineral	121 123	Merrick Morrill	113 115	Macon Madison	093 095	Statume v Towner
103	Knox	049	Hinds	063	Missoula	125	Nance	117	Martin	097	Treili
105	Laciede Lafavette	051 053	Holmes Humphreys	065 067	Musecisheli Park	127 129	Nemaha Nuckolis	119 121	Mecklenburg Mitchell	099 101	Walsh Ward
109	Lawrence	055	Issaquena	069	Petroleum	131	Otoe	123	Montgomery	101	Wells
111	Lewis	057	itawamba	071	Phillips	133	Pawnoe	125	Moore	105	
113 115	Lincoln Linn	059 061	Jackson Jasper	073 075	Pondera Powder River	135 137	Perkins Photos	127 129	Nash New Hanover		New Ha weathing
117	Livingston	063	Jefferson	077	Powell	139	Pierce	131	Northempton		County
119 121	McDonald Macon	065 067	Jefferson Davis Jones	079 081	Prairie Ravalli	141 143	Platte Polk	133 135	Onslow Orange	001 003	Beiknap
123	Madison	069	Kemper	063	Richland	145	Red Willow	137	Pamiico	003	Carroll Cheshin
125	Mariet	071	Lafayette	085	Roosevelt	147	Richardson	139	Pasquotank	007	Coos
127 129	Marion Marcer	073 075	Lemer Leuderdale	087 089	Rosebud Sanders	149 151	Rock Saline	141 143	Pender Perquimans	009 011	Grafton Hillsborn
131	Miller	077	Lawrence	091	Sheridan	153	Sarpy	145	Person	013	Merrimeck
133 135	Mississippi Moniteau	079 081	Lonke Lon	093 095	Silver Bow Stillwater	155 157	Saunders Scotts Bluff	147 149	Pitt Poli:	015	Rockingtem
137	Monroe	083	Leflore	093 097	Sweet Gram	159	Seward	151	Randolph	017 019	Straffor 1 Sullivan
139	Montgomery	085	Lincoln	099	Teton	161	Sheridan	153	Richmond	•••	
141 143	Morgan New Madrid	087 089	Lowndes Medison	101 103	Tools Treasure	163 165	Sherman Sioux	155 157	Robeson Rockingham		New Jervy County
145	Newton	091	Marion	105	Valley	167	Stanton	159	Rowan	001	Atlantic
147 149	Nodeway Ozogon	093 095	Marshall	107	Wheatiand Wibeux	169	Thayer	161	Rutherford	003	Bergen
151	Onge	097	Monroe Montgomery	109 111	Yellowstone	171 173	Thomas Thurston	163 165	Sampson Scotland	905 007	Burling(na Camder
153	Ozark	099	Neshoba	113	Yellowstone Nati	175	Valley	167	Stanly	009	Cape MITT
155 157	Pemiscot Parry	101	Newton Noxubee		Park-Part	177 179	Washington Wayne	169 171	Stokes Surry	011 013	Cumber wnd Essex
159	Pottis	105	Oktibbaha		Nobenska	181	Webster	173	Swain	015	Glonces ✓4
161 163	Phelps Pike	107 109	Panola Pearl River	001	County	183	Wheeler	175	Transylvania	017	Hudson
165	Platte	111	Perry	003	Adams Antelope	185	York	177 179	Tyrreli Union	019 021	Hunterdon Mercer
167	Polk	113	Pike	005	Arthur		North Carolina	181	Vance	023	Middles
169 171	Pulaski Putnam	115 117	Pontotoc Prenties	007 009	Banner Blaine	001	County Alamance	183 185	Wake Warren	025 027	Monmo th
173	Ralls	119	Quitman	011	Boone	003	Alexander	187	Washington	027	Morris Ocean
175 177	Randolph Ray	121 123	Rankin Scott	013 015	Box Butte	005	Alleghany	189	Watauga	031	Passaic
179	Reynolds	125	Sharkey	013	Boyd Brown	007 009	Anson Ashe	191 193	Wayne Wilkes	033 035	Salem Somerar
181	Ripley	127	Simpson	019	Buffalo	011	Avery	195	Wilson	037	Sussex
183 185	St. Charles St. Clair	129 131	Smith Stone	021 023	Burt Butler	013 015	Beaufort Bertie	197 199	Yadkin Yancev	039	Union
187	St. Francois	133	Sunflower	025	Cass	017	Bladen	199	1 ancey	041	Warren
189 193	St. Louis Ste Genevieve	135	Tallahatchie	027	Codar	019	Brunswick		North Dakota		New Marico
195	Saline	137 139	Tate Tippah	029 031	Chase Cherry	021 023	Buncombe Burke	001	County Adams	001	County Bernelli ~
197	Schuyler	141	Tishomingo	033	Cheyenne	025	Cabagrus	003	Barnes	003	Catron
199 201	Scotland Scott	143 145	Tunica Union	035 037	Clay Colfax	027 029	Caldwell Camden	005 007	Benson Billings	005	Chaves
203	Shannon	147	Walthall	039	Cuming	029	Carteret	007	Bottinesu	007 009	Colfax Cuzry
205 207	Shelby Stoddard	149	Warren Washington	041	Custer	033	Caswell	011	Bowman	011	De Baca
209	Stone	151 153	Wassangton Wayne	043 045	Dakota Dawas	035 037	Catawba Chatham	013 015	Burke Burioish	013 015	Dona Are Eddy
211	Sullivan	155	Webster	047	Dawson	039	Cherokee	017	Cass	017	Grant
213 215	Teney Texas	157 159	Wilkinson Winston	049 051	Deuci Dixon	041 043	Chowan Clay	019 021	Cevalier Dickey	019	Guadalu ve
217	Vernon	161	Yalobusha	053	Dodge	045	Cleveland	021	Divide	021 023	Harding Hida le o
219 221	Warren Washington	163	Ya200	055	Douglas	047	Columbus	025	Dunn	025	Lee
223	Wayne		Montane	057 059	Dundy Fillmore	049 051	Craven Cumberland	027 029	Eddy Emmons	027 028	Lincoln Los Alarvos
225	Webster		County	061	Franklin	053	Curituck	033	Golden Valley	029	Lune
227 229	Worth Wright	100	Begverheed Big Horn	063 065	Frontier Furnes	055 057	Dere Devidson	035 037	Grand Forks	031	McKinky
	Independent City	005	Blaine	067	Gage	057	Davie	037	Grant Griens	033 035	Mora Otero
510	St. Louis City	007 009	Broadwater	069	Gerden	061	Duplin	041	Hettinger	037	Quay
	Mississippi	011	Carbon Carter	071 073	Gerfield Gosper	063 065	Durham Edgecombe	043 045	Kidder La Moure	039 041	Rio Azrina Roossvett
001	County Adams	013	Cascade	075	Grant	067	Forsyth	047	Logan	043	Sandova ¹
003	Alcom	015 017	Chouteau Custer	077 079	Greeley Hall	069 071	Fmaklin Geston	049	McHenry	045	San Juan
005	Amite	019	Daniels	061	Hamilton	073	Gates	051 053	McIntosh McKenzie	047 049	San Mig vi Santa Fe
007 009	Attala Benton	021 023	Dewson Deer Lodge	063	Harian	075	Grahem	055	McLean	051	Sierra
011	Boliver	025	Fallon	085 087	Hayes Hitchcock	077 079	Granville Greens	057 059	Mercer Morton	053 055	Socorro
013 015	Calhoun	027	Feegus	089	Holt	061	Geilford	061	Mountrall	057	Taos Torrano:
017	Carroli Chickasaw	029 031	Fintheed Gellatin	091 093	Hooker Howard	063 065	Halifax Harnett	063	Nelson	059	Union
019	Choctaw	033	Gerfield	095	Jefferson	087	Haywood	965 967	Otiver Pembina	061	Valencia
021 023	Claiborne Clarke	03 <i>5</i> 037	Glacier Golden Valley	097	Johnson	089	Henderson	069	Pierce		Novada
025	Clay	039	Granite	099 101	Keerney Keith	091 093	Hertford Hoke	071 073	Ransey Ransom	001	County Churchii`
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	on.	c	On.		Con.		Con.		Con.		Con.
003	Clark	015	Brown	017	Canadian	041	Lincoln	007	Providence	079	Lake
005	Douglas		Butler	019	Carter Cherokee	043 045	Linn Malheur	009	Washington	081 083	Lawrence Lincoln
007 009	Elko Esmeralda		Carroli Champaign	021 023	Choctaw	047	Marion		South Carolina	085	Lyman
011	Eureka		Clark	025	Cimarron	049	Morrow		County	087	McCank
013	Humboldt	025	Clermont	027	Cleveland	051	Multnomah	001	A bbeville	089	McPh **son
015	Lander		Clinton	029	Coal	053 055	Polk	003 005	Aiken Allendale	091 093	Marsh vil Mead v
017 019	Lincoln Lyon		Columbiana Coshocton	031 033	Comanche Cotton	057	Sherman Tillamook	003	Anderson	095	Melle'te
021	Mineral		Crawford	035	Craig	059	Umatilia	009	Bamberg	097	Miner
023	Nyc	035	Cuyahoga	037	Creek	061	Union	011	Barnwell	099	Minnchaha
027	Pershing	037	Darke	039	Custer	063	Wallowa	013	Beaufort	101	Moody
029	Storey	039	Defiance	041	Delaware	065	Wasco	015 017	Berkeley Calhoun	103 105	Pennington Perkins
031 033	Washoc White Pine	041 043	Delaware Erse	043 045	Dewey Ellis	067 069	Washington Wheeler	017	Charleston	103	Potter
033	Independent City	045	Fairfield	047	Garfield	071	Yamhili	021	Cherokec	109	Roberts
510	Carson City	047	Fayette	049	Garvin			023	Chester	111	Sanborn
	-	049	Franklin	051	Grady		Pennsylvania		Chesterfield	113	Shannon
	New York	051	Fulton	053 055	Grant	001	County Adams	027 029	Clarendon Colleton	115 117	Spint Stanley
001	County Albany	053 055	Gallia Geauga	055 057	Greer Harmon	001	Allegheny	031	Darlington	119	Sully
003	Allegany	057	Greene	059	Harper	005	Armstrong	033	Dillon	121	Tode
005	Bronx	059	Guernsey	061	Haskell	007	Beaver	035	Dorchester	123	Tripp
007	Broome	061	Hamilton	063	Hughes	009 011	Bedford Berks	037 039	Edgefield Fairfield	125 127	Turn** Union
009 011	Cattaraugus Cayuga	063 065	Hancock Hardin	065 067	Jackson Jefferson	013		041	Florence	129	Walworth
013	Chautauqua	067	Harrison	069	Johnston	015		043	Georgetown	131	Wash hough
015	Chemung	069	Henry	071	Kay	017	Bucks	045	Greenville	135	Yankton
017	Chenango	071	Highland	073	Kingfisher	019		047	Greenwood	137	Ziebwh
019	Clinton	073 075	Hocking Holmes	075 077	Kiowa Latimer	021 023	Cambria Cameron	049 051	Hampton Horry		Tenresse
021 023	Columbia Cortland	073	Huron	077	Le Flore	025		053	Jasper		County
025	Delaware	079	Jackson	081	Lincoln	027		055	Kershaw	001	And Tson
027	Dutchess	081	Jefferson	083	Logan	029		057	Lancaster	003	Bedf wd
029	Erie	083	Knox	085	Love	031		059	Laurens	005 007	Benton Bledine
031 033	Essex Franklin	085 087	Lake Lawrence	087 089	McClain McCurtain	033 035		061 063	Lee Lexington	007	Blount
035	Fulton	089	Licking	091	McIntosh	037		065	McCormick	őlí	Bradley
037	Genesce	091	Logan	093	Major	039		067	Marion	013	Cambell
039	Greene	093	Lorain	095	Marshall	041			Marlboro	015	Cannon
041	Hamilton	095	Lucas	097 0 5 9	Mayes	043 045		071 073	Newberry Oconee	017 019	Carroll Carter
043 045	Herkimer Jefferson	097 099	Madison Mahoning	101	Murray Muskogee	047		073	Orangeburg	021	Chertham
047	Kings	101	Marion	101	Noble	049		077	Pickens	023	Cherter
049	Lewis	103	Medina	105	Nowata	051		079	Richland	025	Clail~rne
051	Livingston	105	Meigs	107	Okfuskee	053		081	Saluda	027	Clay
053 055	Madison Monroe	107 109	Mercer	109	Oklahoma Okmulgee	055 057		083 085	Spartanburg Sumter	029 031	Coche Coff :=
057	Montgomery	111	Miami Monroe	111 113		059		087	Union	033	Crockett
059	Nassau	113	Montgomery	115		061			Williamsburg	035	Curr berland
061	New York	115	Morgan	117	Pawnee	063	Indiana	091	York	037	Davidson .
063	Niagara	117	Morrow	119		069			0. 4 0.4.4.	039	Decreus
065 067	Oneida Onondaga	119 121	Muskingum Noble	121 123	Pittsburg Pontotoc	061 069			South Dakota County	041 043	De Kalb Dickson
069	Ontario	123	Ottawa	125	Pottawator			003	Aurora	045	Dye
071	Orange	125	Paulding	127	Pushmatah	a 073		005	Beadle	047	Fayette
073	Orleans	127	Perry	129	Roger Mill			007	Bennett	049	Fen*ress
075 077	Oswego Otsego	129 131	Pickaway Pike	131 133		077 079		009 011	Bon Homme Brookings	051 053	Franklin Gib:∾n
079	Putnam	133	Portage	135		08		013	Brown	055	Gile
081	Queens	135	Preble	137	Stephens	083	McKean	015	Brule	057	Gra/veer
083	Rensselaer	137	Putnam	139		089		017	Buffalo	059	Grenne
085 087	Richmond Rockland	139 141	Richland Ross	141 143		08°		019 021	Butte Campbell	061 063	Grundy Hambien
089	St. Lawrence	143	Sandusky	145		09			Charles Mix	065	Hamilton
091	Saratoga	145	Scioto	147	Washingto		Montour	025	Clark	067	Hancock
093 095	Schenectady	147	Seneca	149		099			Clay	069	Har teman
097	Schoharie Schuyler	149 151	Shelby Stark	151 153		091		rland 029 031	Codington Corson	071 073	Hartin Havkins
099	Seneca	153	Summit	133	WOODWEIG	10			Custer	075	Hay wood
101	Steuben	155	Trumbull		Oregon	10:		035	Davison	077	Hen derson
103	Suffolk	157	Tuscarawas		County	10:		037	Day	079	Henry
105 107	Sullivan Tioga	159 161	Union Van Wert	001		10		039 041	Deuel	081 083	Hic∱man Hovston
109	Tompkins	163	Vinton	003				043	Dewey Douglas	085	Humphreys
111	Ulster	165	Warren	007		111		045	Edmunds	087	Jackson
113	Warren	167	Washington	009	Columbia	iii				089	Jeff `*son
115	Washington	169		011	Coos	[1]		049		091	Johnson
117 119	Wayne Westchester	171 173		013 013		111		051 053		093 095	Knox
121	Wyoming	175		013		12		053		093 097	Lak : Lau derdale
123			•	019	Douglas	12:	Washington			099	Lavrence
	Ob to		Oklahoma	021	Gilliam	12	7 Wayne	059	Hand	101	Levris
	Ohio County	100	County Adair	02:		12				103	Linroln
001	Adams	001		02: 02:		13 er 13:		063 065		105 107	Lordon McNinn
003	Allen	005	Atoka	029		13.		067		107	McNairy
005		007	Beaver	031	Jefferson		Rhode Islan	nd 069	Hyde	111	Macon
007 009		009		033			County	071		113	Madison
011		011 013		03: 03:		00 00		073 075		115 117	Marion Marshall
013		015		039		00		073		119	Manry
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	on.		Con.	c	ion.		Con.		Con.		Con.
121	Meigs	109	Culberson	293	Limestone	477	Washington	085	Hanover	830	Williamsburg
123	Monroe	111	Dellam	295	Lipscomb Live Oak	479 481	Webb Wharton	087 089	Henrico Henry	840	Winchester
125 127	Montgomery Moore	113 115	Dallas Dawson	297 299	Live Oak	483	Wheeler	091	Highland	VT	Vermont
129	Morgan	117	Deaf Smith	301	Loving	485	Wichita	093	late of Wight	001	County
131	Obion	119	Delta	303	Lubbock	487 489	Wilbarger Willacy	095 097	James City King and Queen	001	Addison Bennington
133 135	Overton Perry	121 123	Denton De Witt	305 307	Lynn McCulloch	491	Williamson	099	King George	005	Caledonia
137	Pickett	125	Dickens	309	McLennan	493	Wilson	101	King William	007	Chittenden
139	Polk	127	Dimmit	311	McMullen	495	Winkler	103 105	Lancaster	009 011	Essex Franklin
141 143	Putnam Rhee	129 131	Donley Duval	313 315	Madison Marion	497 499	Wise Wood	103	Lee Loudoun	013	Grand late
145	Roane	133	Eastland	317	Martin	501	Yoakum	109	Louise	015	Lamoille
147	Robertson	135	Ector	319	Mason	503	Young	111	Lunenburg	017 019	Orange Orleans
149	Rutherford	137	Edwards Filis	321 323	Matagorda Maverick	505 507	Zapata Zavala	113 115	Madison Mathews	021	Rutland
151 153	Scott Sequetchie	139 141	El Paso	325	Medina	307	2.21 000	117	Mecklenburg	023	Washington
155	Sevier	143	Erath	327	Menard		Utah	119	Middlesex	025	Windham Windsor
157	Shelby	145	Falls	329	Midland Milam	001	County Beaver	121 123	Montgomery Nansemond	027	Wildson
159 161	Smith Stewart	147 149	Fannin Fayette	331 333	Mills	903	Box Elder	125	Nelson		Washington
163	Sullivan	iší	Fisher	335	Mitchell	005	Cache	127	New Kent		County
165	Sumner	153	Floyd	337	Montague	007	Carbon	131	Northampton	001 003	Adams Asotin
167	Tipton	155	Foard Fort Bend	339 341	Montgomery Moore	009 011	Daggett Davis	133 135	Northumberland Nottoway	003	Benton
169 171	Trousdale Unicoi	157 159	Franklin	343	Mooris	013	Duchesne	137	Orange	007	Chelan
173	Union	161	Freestone	345	Motley	015	Emery	139	Page	009	Clallem
175	Van Buren	163	Frio	347	Nacogdoches Navarto	017 019	Garfield Grand	141 143	Patrick Pittsylvania	011 013	Clark Columbia
177 179	Warren Washington	165 167	Gaines Galveston	349 351	Newton	021	Iron	145	Powhetan	015	Cowlitz
181	Wayne	169	Garza	353	Nolan	023	Juab	147	Prince Edward	017	Douglas
183	Weakley	171	Gillespie	355	Nueces	025	Kane	149	Prince George Prince William	019 021	Ferry Franklin
185 187	White Williamson	173 175	Glasscock Goliad	357 359	Ochiltree Oldham	027 029	Millard Morgan	153 155	Pulaski	021	Garfield
189	Wilson	177	Gonzales	361	Orange	031	Pinte	157	Rappahannock	025	Grant
		179	Gray	363	Palo Pinto	033	Rich	159	Richmond	027	Grays Harbor
	Texas County	181 183	Grayson	365 367	Panola Parkar	035 037	Salt Lake San Juan	161 163	Roanoke Rockbridge	029 031	island Jefferson
001	Anderson	185	Gregg Grimes	369	Parmer	039	Sanpete	165	Rockingham	033	King
003	Andrews	187	Guadalupe	371	Pecos	041	Sevier	167	Russell	035	Kitsap
005	Angelina	189	Hale Hali	373 375	Polk Potter	043 045	Summit Tooele	169 171	Scott Shenandoah	037 039	Kittitas Klickitet
007 009	Aranses Archer	191 193		373	Presidio	047	Uintah	173	Smyth	041	Lewis
011	Armstrong	195	Hansford	379	Rains	049	Utah	175	Southampton	043	Lincoln
013	Atascosa	197		381 383	Randali	051 053	Wasatch Washington	177 179	Spotsylvania Stafford	045 047	Mason Okanogan
015 017	Austin Bailey	199 201		385	Rosgan Rosi	055	Wayne	181	Surry	049	Pacific
019	Bandera	203	Harrison	387	Red River	057	Weber	183	Sussex	051	Pend Oreille
021	Bastrop	205		389 391	Roeves		Mantala	185 187	Tazewell Warren	053 055	Pierce San Juan
023 025	Baylor Bee	207 209		391 393	Refugio Roberts		Virginia County	191	Washington	057	Skagit
027	Bell	211		395	Robertson	901	Accomack	193	Westmoreland	059	Skamania
029	Bexar	213		397	Rockwall	003	Albemarie	195	Wise	061 063	Snohomish Spokane
031 033	Blanco Borden	215 217		399 401	Runnels Rusk	905 907	Alleghany Amelia	197 199	Wythe York	065	Stevens
035	Bosque	219		403	Sabine	009	Amherst		ndependent City	067	Thurston
037	Bowie	221		405	San Augustine	011	Appomattox	510	Alexandria	069	Wahktakuru
039	Brazoria Brazos	223 225		407 409	San Jacinto San Patricio	013 015	Arlington Augusta	515 520	Bedford Bristol	071 073	Walls Walls Whatcom
043	Brewster	227		411	San Saba	017	Bath	530	Buene Vista	075	Whitman
045	Briscoe	229	Hudspeth	413	Schleicher	019		540	Charlottesville	077	Yakima
047 049	Brooks	231 233		415 417	Scurry Sheckelford	021 023	Bland Botetourt	550 560	Chesapeake Chifton Forge		Wisconsin
051	Brown Burleson	233		417	Shelby	025		570	Colonial Heights		County
053	Burnet	237	Jack	421	Sherman	027	Buchanan	580	Covington	001	Adams
055	Caldwell Calboun	239		423	Smith	029		590	Danville	003 005	Ashland Barron
057 059	Calhoun Callahan	241 243		425 427	Somervell Starr	031 033	Campbell Caroline	595 600	Emporia Fairfax	907	Bay field
061	Cameron	24		429	Stephens	035	Carroll	610	Falls Church	009	Brown
063	Camp	24		431	Sterling	036		620	Franklin	011	Buffalo
065 067	Carson Cass	249 25		433 435	Stonewall Sutton	037 041	Charlotte Chesterfield	630 640	Fredericksburg Galax	013 015	Burnett Calumet
069	Castro	25		437	Swisher	043		650	Hampton	017	Chippewa
071	Chambers	25		439	Tarrant	045		660	Harrisonburg	019	Clark
073	Cherokee Childress	25° 25°		441 443	Taylor	047		670	Hopewell	021 023	Columbia Crawford
075 077		26		445	Terrell Terry	049 051		678 680		025	Dane
079	Cochran	263	3 Kent	447	Throckmorton		Dinwiddle	690	Martinsville	027	Dodge
061	Coke	26		449	Titus	057		700		029	Door
083 385		26° 26°		451 453	Tom Green Travis	059 061		710 7 20		031 033	Dougles Dunn
087	Collingsworth	27	1 Kinney	455	Trinity	063		730	Petersburg	035	Eau Claire
089		27		457	Tyler	065	Fluvanna	740		037	Florence
091 093		27 27		459 461		067 069		750 760		039 041	Fond Du Lac Forest
095		27		463		071		770		043	Grant
097	Cooke	28	1 Lampeses	465	Val Varde	073	Gloucester	775	Salem	045	Green
099 101		28 28		467 469		075 077		780 790		047 049	Green Lake Iowa
103		28		471		079		900 800		051	iron
105	Crockett	28	9 Leor	473	Waller	081	Greensville	810	Virginia Beach	053	Jackson
107	Crosby	29	1 Liberty	475	Ward	083	Halifax	820	Waynesboro	055	Jefferson

Con. Con. West Virginia Con. Con	a. Gr.
	Randolph 009 Converse
	Ritchie 011 Crook
	Roane 013 Fremont
	Summers 015 Goshen
	Taylor 017 Hot Springs
	Tucker 019 Johnson
069 Lincoln 111 Sauk 011 Cabell 053 Mason 095 Ty	Tyler 021 Laramia
071 Manitowoc 113 Sawyer 013 Calhoun 055 Mercer 097 Up	Jpshur 023 Lincoln
073 Marathon 115 Shawano 015 Clay 057 Mineral 099 Wi	Vayne 025 Natrona
075 Marinette 117 Sheboygan 017 Doddridge 059 Mingo 101 We	Webster 027 Njobrara
077 Marquette 119 Taylor 019 Fayette 061 Monongalia 103 We	Vetzel 029 Park
	Virt 031 Pintte
	Vood 033 Sheridan
	Vyoming 035 Sublette
083 Oconto 127 Walworth 027 Hampshire 069 Ohio	037 Sweetwater
	Vyoming 039 Teton
	County 041 Uinta
	Albany 043 Washakia
	lig Horn 045 Weston
	ampbell
	Carbon
097 Portage 141 Wood	
Alaska Con. Con. Con.	on. Con.
Census division 060 Bristol Bay 110 Juneau 160 Kuskokwim 210 Se	Seward 250 Upper Yukon
010 Aleutian Islands Borough 120 Kenai-Cook 170 Matanuska- 220 Si	Sitka 260 Valdez-Chitina-
	Skagway- Whittier
The state of the s	
The rest of the re	Yakutat 270 Wade Hampton
5.0 Date: Notal 500 Landarks 140 Robin 150 Outer Reichigan 240 St	Southeast 280 Wrangell-Petersburg
	Fairbanks 290 Yukon-Koyukuk
050 Bethel	

Table 2--NAWDEX Organizational Codes

Foreign Organizations

Organization Name

Code	
CAX01	Inland Water Directorate, Water Resources Branch, Canada

Federal Organizations

USBLM	Bureau of Land Management
USBR	Water and Power Resources Services
USCE	Corps of Engineers
USEPA	Environmental Protection Agency
USERD	Energy Research and Development Administration
USFS	Forest Service
USFWS	Fish and Wildlife Service
USGS	Geological Survey
USIBW	International Boundary and Water Commission
USSCS	Soil Conservation Service
USTVA	Tennessee Valley Authority

Non-Federal Organizations with State or Local Jurisdiction

AR001	Bureau of Environmental Engineering, Arkansas
	Department of Health
AZ001	Water Resources Research Center, Arizona University
AZ003	Arizona Game and Fish Department
CA001	California Department of Water Resources
CA009	California State Water Resources Control Board
CA011	California Department of Transportation
CA059	Orange County Health Department, California
CA064	Lahontan Region, California Regional Water Quality Control Board
CA065	Pacific Gas and Electric Company
CA066	Southern California Edison Company
CA070	San Diego State University, Center for Marine Studies, California
CA080	Diablo Valley College, California
CA082	Merrit College, California
CA103	Moss Lunding Marine Laboratory, California
CA104	University of California, Sanitary Engineer Research Laboratory
CA105	University of California, Lawrence Livermore Laboratory
CA112	Regional Water-Quality Control Board, North Coast Region, California
CA113	San Francisco Bay Region, California Regional Water Quality Control Board

Table 2--NAWDEX Organizational Codes (Continued)

CA114	Central Coast Region, California Regional Water Quality Control Board
CA115	Los Angeles Region, California Regional Water Quality Control Board
CA118	Regional Water Quality Control Board, Santa Ana Region, California
CA119	San Diego Region, California Regional Water Control Board
CA120	University of Southern California
C0003	Water Division, City of Colorado Springs, Colorado
CT001	Environmental Health Service Division, Connecticut Dept. of Health
FL051	Florida Department of Environmental Regulation
GA009	Environmental Protection Division, Georgia Dept. of Natural Resources
IA007	Agricultural Engineering Department, Iowa State University
ID002	Idaho Fish and Game Department
ID004	Idaho Department of Health and Welfare
IN001	Division Stream Pollution Control, Indiana State Board
777001	of Health
ĶY001	Kentucky Department for Natural Resources and Environmental Protection
MI001	Michigan Department of Natural Resources
MNO12	Minnesota Pollution Control Agency
м0003	Metropolitan St. Louis Sewer District, Missouri
NC004	North Carolina Department of Natural Resources and Community Development
NV005	Division of Renewable Natural Resources, University of Nevada
ORO01	Department of Forest Engineering, Oregon State University
OR005	Oregon Department of Fish and Wildlife
PA001	Pennsylvania Department of Environmental Resources
SRBC	Susquehanna River Basin Commission
TN002	Division of Water Quality Control, Tennessee Department of Public Health
TX001	Texas Department of Natural Resources
TX007	Texas Water Quality Board
UT001	Utah State Health Department
VA001	Virginia State Water Control Board
VT003	Vermont Water Resources Research Center, University of
	Vermont, Burlington, Vermont
WA004	College of Fisheries, University of Washington
WA006	Department of Zoology, University of Washington
WA011	Seattle Water Pollution Control, Washington
WI001	Wisconsin Department of Natural Resources
WI003	Dairyland Power Cooperative, Wisconsin
WY004	Water Resources Research Institute, University of Wyoming
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STATION NAME AND LOCATION		1 SHIELDS BRANCH & FIELD MARKER 1 ST. JOHN R. E. OF BR. AT DICKEY 1 LITTLE BLACK R. N. OF BR. & ALLA 1 LITTLE BLACK R. AT BOAT LANDING	CHIMENTICOOK STR. @ CROSSING POCWOCK STR. @ FIELD MARKER BIG BLACK R. NR ST. JOHN R. ST. JOHN R. @ NINE MILE BRK. NINE MILE BRK. @ ST. JOHN R.	1 ST. JOHN RIVER AT DICKEY, ME 1 ST. JOHN RIVER AT VAN BUREN, ME 2 ALLAGASH R. W. OF BR. © ALLAGASH 2 ALLAGASH RIVER NEAR ALLAGASH, ME 4 AROOSTOOK RIVER AT CARIBOU, ME	PENOBSCOT RIVER AT WEST ENFIELD, ME PENOBSCOT RIVER AT EDDINGTON, ME KENNEBEC RIVER AT BINGHAM, ME KENNEBEC RIVER AT NORTH SIDNEY, ME WILD RIVER AT GILEAD, ME	LAPHAM BROOK AT WEST AUBURN, ME LAPHAM BROOK AT YOUNG CORNER, ME HODGKINS BROOK NEAR AUBURN, ME TAYLOR BROOK AT STEVENS MILL, ME ANDROSCOGGIN RIVER NEAR AUBURN, ME	ST. CROIX RIVER AT MILLTOWN, ME NARRAGUAGUS RIVER AT CHERRYFIELD, ME ANDROSCOGGIN RIVER AT BRUNSWICK, ME PRESUMPSCOT RIVER NEAR WEST FALMOUTH, ME SACO RIVER AT CORNISH, ME	BLACKSMITH BROOK AT WELLS, ME. PEMIGEWASSET RIVER AT PLYMOUTH, NH MERRIMACK RIVER ABOVE LOWELL MERRIMACK RIVER AT CONCORD, NH	
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LONGITUDE	07 12744	0712217 0711756 0720135 0712701	0713752 0720234 0720223	0722604 0722507 0723105 0724800	0720502 0720534 0720903 0721334 0722619	0725104 0725120 0724332 0724139 0723914	0724016 0721551 0723628 0723621 0723348	0724806 0725346 0724158 0724251	
LATITUDE	431422	423802 423845 431533 422555 423812	441608 440913 442156	430504 434251 431231 425600	424103 423737 423747 423832 423551	423733 423733 423818 423231 423209	424212 421056 415958 415914 415442	412144 421414 4 20624 415320	
STATION NAME AND LOCATION	SOUCOOK RIVER NEAR CONCORD, NH	MERRIMACK RIVER ABOVE LOWELL, MA MERRIMACK RIVER BL CONCORD RIVER AT LOWELL, WEST BRANCH WARNER RIVER NEAR BRADFORD, NH ASSABET RIVER AT MAYNARD, MA CONCORD R REIOW R MEADOW RROOK, AT LOWELL M	AMMONDOSUC RIVER AT BETHLEHEM JUNCTION, NH CONNECTICUT RIVER AT WELLS RIVER, VT PASSUMPSIC, VT CONNECTICUT DIVER AT NODTH WALDOLE NH	CONNECTION RIVER AT WALPOIL, NH WHITE RIVER AT WEST HARTFORD, VT WILLIAMS RIVER AT BROCKWAYS MILLS, VT NB FIRE DISTRICT 1 WWTP-W DOVER	MILLERS RIVER NEAR WINCHENDON, MA OTTER RIVER NEAR BALDWINSVILLE, MA MILLERS RIVER AT SOUTH ROYALSTON, MA EAST BRANCH TULLY RIVER NEAR ATHOL. MA MILLERS RIVER AT ERVING, MA	BEAVER BROOK AT WILMINGTON, VT DEERFIELD RIVER AT CHARLEMONT, MA NORTH RIVER AT SHATTUCKVILLE, MA SOUTH RIVER NEAR CONWAY, MA DEERFIELD RIVER NEAR WEST DEERFIELD, MA	GREEN RIVER NEAR COLRAIN, MA QUABDAG RIVER AT WEST BRIMFIELD, MA CONNECTICUT R CANAL LOCKS ENFIELD CONNECTICUT R AT THOMPSONVILLE, CT SCANTIC R AT BROAD BROOK, CT.	FARM RIVER, AT AUGUR ROAD, NEAR NORTHFORD, C WEST BRANCH WESTFIELD RIVER AT HUNTINGTON, M WESTFIELD RIVER NEAR WESTFIELD, MA WINDSOR SITE WASTE EFFLUENT	
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DRAINAGE AREA	184.00 211.00 227.00 30.30	14.70 56.10 277.00 260.00 35.20	295.00	408.00 90.00	5.64	6.55 12.60	
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LATITUDE	421522 421859 420220 415927	415630 414612 420116 415605 413426	412301, 420124 415926 413156 414706	414056 413331 411800 411640 411810	411628 411821 411642 411725 411633	411845 411708 411657 411804 411645	412434 412525 412434 412418
STATION NAME AND LOCATION	CHARLES RIVER AT DOVER, MA CHARLES RIVER AT WELLESLEY, MA CHARLES RIVER AT WALTHAM, MA CHARLES RIVER AT WALTHAM, MA CHONES RIVER AT KINGSTON, MA	EEL RIVER NEAR PLYMOUTH, M WEWEANTIC RIVER AT SOUTH W BLACKSTONE RIVER AT MILLVI TAUNTON RIVER AT STATE FAR WOOD RIVER NEAR ARCADIA, R	PAWCATUCK RIVER AT WESTERLY, RI QUINEBAUG R RT 197 BRIDGE THOMPSON FRENCH R RT 12 BRIDGE GROSVENORDAL THAMES R RT 2 BRIDGE NORWICH WILLIMANTIC R RT 32 & RT 275	SHETUCKET R AT SOUTH WINDHAM, CT 2 YANTIC R AT YANTIC, CT 4 PATCHOGUE R AT WESTBROOK, CT. 4 PATCHOGUE R AT GROVE BEACH, CT. 5 MENUNKETESUCK R NR CLINTON, CT.	MENUNKETESUCK RIVER AT GROVE BEACH, CT. 1 INDIAN RIVER NR CLINTON, CT. 1 INDIAN R AT CLINTON, CT. 1 HAMMONASSET R NR CLINTON, CT. 1 HAMMONASSET R AT CLINTON, CT.	EAST R NR GUILFORD, CT. EAST R NR GUILFORD, CT. NECK R NR MADISON, CT. WEST R NR GUILFORD, CT.	FARM R, AT REEDS GAP ROAD EAST, NR NORTHFORD PISTAPAUG POND OUTLET NEAR EAST WALLINGFORD, I TRIBUTARY TO FARM RIVER NEAR NORTHFORD, CT. FARM RIVER NEAR NORTHFORD, CT.
HYDROLOGIC Unit Code	01090001 01090001 01090001 01090000	01090002 01090002 01090003 01090004	01090005 01100001 01100001 01100002	01100002 01100004 01100004 01100004	01100004 01100004 01100004 01100004	01100004 01100004 01100004 01100004	01100004 01100004 01100004 01100004

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LATITUDE	412256 412038 412009 412009	411924 411920 411740 411637 421355	421131 413911 414353 414310 414202	414057 413646 413644 413432 413326	413136 412759 412302 411201 414102	414119 414120 414121 414133 414133	414136 414141 414143 414143	
STATION NAME AND LOCATION	FARM RIVER AT NORTHFORD, CT FARM RIVER NEAR TOTOKET, CT TRIB TO FARM R, AT BARBERRY RD, AT TOTOKET, TRIBUTARY TO FARM RIVER AT TOTOKET, CT. BURRS BROOK AT TOTOKET, CT	FARM RIVER AT FOXON,CT MALONEY BROOK AT FOXON,CT FARM RIVER NEAR EAST HAVEN,CT FARM RIVER AT EAST HAVEN,CT HOUSATONIC RIVER NEAR GREAT BARRINGTON, MA	GREEN RIVER NEAR GREAT BARRINGTON, MA HOUSATONIC R AT GAYLORDSVILLE, CT. LAKE WARAMAUG BROOK AT WARREN, CT LAKE WARAMAUG BROOK NEAR WARREN, CT LK WARAMAUG BK NR NEW PRESTON,CT (INFLOW SIT	EAST ASPETUCK RIVER AT NEW PRESTON, CT NONEWAUG R NR BETHLEHEM CT EAST SPRING BK NR BETHLEHEM CT NONEWAUG RIVER AT MINORTOWN, CT.	POMPERAUG RIVER AT POMPERAUG, CT. POMPERAUG RIVER AT SOUTH BRITAIN, CT. HOUSATONIC R AT STEVENSON, CT HOUSATONIC R AT STRATFORD, CT TRIB TO LK WARAMAUG AT NEW PRESTON (INFL STE	TRIB TO LK WARAMAUG AT NEW PRESTON (INFL STETRIB TO LK WARAMAUG NR NEW PRESTON (INFL STETRIB TO LK WARAMAUG AT NEW PRESTON (INFL STETRIB TO LK WARAMAUG AT NEW PRESTON (INFL STETRIB TO LK WARAMAUG NR NEW PRESTON (INFL STE	TRIB TO LK WARAMAUG NR NEW PRESTON (INFL STE TRIB TO LK WARAMAUG NR NEW PRESTON (INFL STE TRIB TO LK WARAMAUG NR NEW PRESTON (INFL STE TRIB TO LK WARAMAUG NR NEW PRESTON (INFL STE	
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LONGITUDE	<u>O</u>	0731000 0733528 0724437 0730423	0724155 0733658 0733524 0733425 0735435	0733904 0730648 0730728 0730537	0731150 0734059 0734028 0734122 0735155	0735400 0734229 0742610 0742703 0742636	0742824 0742745 0742734 0742440 0742015	0734145 0735425 0734600 0742320	
LATITUDE	ANTIC	441600 431552 441642 444045	445730 431820 431750 430554 430518	425616 423520 423640 424208 424221	424232 425419 424719 424508 424931	425140 424707 421915 422350 422418	422544 422757 422807 423210 423600	423645 424043 423107 420659	
STATION NAME AND LOCATION	MID ATL	LAPLATTE RIVER WATERSHED HUDSON RIVER AT ROGERS ISLAND AT FORT EDWARD MAD RIVER NEAR MORETOWN, VT LAMOILLE RIVER AT EAST GEORGIA, VT	MISSISQUOI RIVER NEAR EAST BERKSHIRE, VT HUDSON RIVER AT GLENS FALLS NY HUDSON RIVER AT FENIMORE NY HUDSON RIVER AT SCHUYLERVILLE NY KAYDEROSSERAS CREEK NR WEST MILTON N.Y.	HUDSON RIVER AT STILLWATER, N.Y. DRY BROOK NEAR ADAMS, MA HOOSIC RIVER AT ADAMS, MA NORTH BRANCH HOOSIC RIVER AT NORTH ADAMS. MA HOOSIC RIVER NEAR WILLIAMSTOWN, MA	GREEN RIVER AT WILLIAMSTOWN, MA HUDSDN RIVER AT BRIDGE AT MECHANICVILLE NY HUDSON RIVER AT WATERFORD NY RT 4 BRIDGE HUDSON RIVER AT GREEN ISLAND NY KAPL KNOLLS SITE PARSHALL FLUME	MOHAWK R AT REXFORD FLATS NY MOHAWK RIVER AT COHOES, N. Y. SCHOHARIE C AT PRATTSVILLE NY SCHOHARIE CREEK AT GILBDA NY PLATTER KILL AT GILBOA N.Y.	MINE KILL NEAR NORTH BLENHEIM NY SCHOHARIE CREEK AT NORTH BLENHEIM, N. Y. WEST KILL AT NORTH BLENHEIM NY SCHOHARIE CREEK AT BREAKABEEN NY SCHOHARIE CREEK AT MIDDLEBURG NY	MILL CREEK NR EAST GREENBUSH NY NORMANS KILL NEAR WESTMERE NY HUDSON RIVER BELOW CASTLETON-ON-HUDSON NY ESOPUS CREEK AT SHANDAKEN, NY	
HYDROLOGIC UNIT CODE	200002	02010002 02010003 02010003 02010005	02010007 02020003 02020003 02020003	02020003 02020003 02020003 02020003	02020003 02020003 02020003 02020003	02020004 02020004 02020005 02020005 02020005	02020005 02020005 02020005 02020005 02020005	02020006 02020006 02020006 02020006	

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DRAINAGE AREA	192.00 4.38 29.40	60.80 59.40 17.30	58.00 29.60 55.40 100.00 116.00	136.00 29.40 68.50 361.00 90.40	118.00 355.00 372.00 745.00	803.00 16.40 45.00 54.60	16.90 25.50 40.90 20.90
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LONGITUDÈ	0741616 0741845 0742021 0743736 0743521	0743432 0743559 0742833 0735729 0735824	0735927 0740119 0743145 0742323 0742440	0742053 0742722 0742051 0741623	0740948 0741656 0741622 0741558 0741335	0740746 0740648 0740556 0740451 0740946	0741322 0741844 0741700 0742353
LATITUDE	420051 420455 420539 410159 410643	411138 411202 411321 412213 411018	405955 405933 404048 404331 405406	405129 404821 405042 405350 410233	410551 405809 405352 405332 405305	405337 405952 405647 405325	404033 404111 403705 401746
STATION NAME AND LOCATION	ESOPUS CREEK AT COLDBROOK NY 0136240001-ESOPUS CREEK AT PHONECIA NY 0136230001-ESOPUS CREEK AT WOODLAND NY 7 WALLKILL R AT DUTFLOW OF LK MOHAWK AT SPARTA 7 WALLKILL R AT FRANKLIN NJ	WALLKILL R NR SUSSEX NJ 7 PAPAKATING C AT SUSSEX NJ 8 BLACK C NR VERNON NJ 8 HUDSON RIVER AT HIGHLAND FALLS NY 9 HACKENSACK R AT BROOKSIDE PK N Y	HACKENSACK R AT RIVERVALE NU PASCACK BK AT WESTWOOD NU PASSAIC R NR MILLINGTON NU PASSAIC R NR CHATHAM NU ROCKAWAY R AB RE AT BOONTON NU	ROCKAWAY R AT PINE BROOK NU WHIPPANY R AT MORRISTOWN NU WHIPPANY R NR PINE BROOK NU PASSAIC R AT TWO BRIDGES NU WANAQUE R AT WANAQUE NU	RAMADO RIVER NEAR MAHWAH NU POMPTON R AT POMPTON PLAINS NU POMPTON R AT TWO BRIDGES NU PASSAIC R AT RT 46 AT SINGAC NU PASSAIC R AT LITTLE FALLS NU	PASSAIC R AT RT 46 AT ELMWOOD PARK NU HOHOKUS BK AT HOHOKUS NU SADDLE R AT PARAMUS NU SADDLE R AT LODI NU THIRD RIVER AT PASSAIC, NU	ELIZABETH R AT URSIND LAKE AT ELIZABETH NU RAHWAY R NR SPRINGFIELD NU RAHWAY R AT RAHWAY NU MAMALDAM BK AT FEDERAL RD NR MANALADAN NA
HYDROLOGIC Unit Code	02020006 02020006 02020006 02020007 02020007	02020007 02020007 02020007 02020008 02030103	02030103 02030103 02030103 02030103	02030103 02030103 02030103 02030103	02030103 02030103 02030103 02030103	02030103 02030103 02030103 02030103	02030104 02030104 02030104 02030104

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DRAINAGE AREA	7.52 9.71 9.96 6.43	16.60 47.70 65.30 68.80 12.30	11.80 41.30 147.00 4.61 4.31	181.00 2.24 25.70 1.98 265.00	9.51 7.57 26.20 63.80 7.37	10.90 32.80 2.18 53.60 57.30	1.02	
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LONGITUDE	0741026 0741016 0740655 0740414 0740358	0744345 0744918 0745245 0745352 0745615	0745809 0745458 0745210 0745054 0744940	0744812 0745252 0744942 0744952 0744148	0744350 0743734 0743811 0744056 0743802	0743840 0744350 0744509 0744338	0744538 0744958 0744601 0744525	
LATITUDE	401947 401747 401910 401156 40113	404843 404540 404040 403949 404129	403851 403821 403421 403628 403115	403101 403055 402818 402541 403248	403330 404616 404230 403809 405103	405007 404339 404316 403938 403802	403836 403805 403724 403731	
STATION NAME AND LOCATION	WILLOW BK NR HOLMDEL NJ YELLOW BK AT COLTS NECK NJ SWIMMING R NR RED BANK NJ SHARK R NR NEPTUNE CITY NJ JUMPING BK NR NEPTUNE CITY NJ	DRAKES BK AT BARTLEY NJ SB RARITAN R AT MIDDLE VALLEY NJ SB RARITAN R NR HIGH BRIDGE NJ SB RARITAN R ARCH ST AT HIGH BRIDGE NJ SPRUCE RUN AT GLEN GARDNER, NJ	MULHDCKAWAY C AT VAN SYCKEL NJ SPRUCE RN AT CLINTON NJ SB RARITAN R AT STANTON NJ PRESCOTT BK AT ROUND VALLEY NJ BUSHKILL AT ROCKEFELLOWS MILLS NJ	SB RARITAN R AT THREE BRIDGES NJ WALNUT BK NR FLEMINGTON NJ NESHANIC R AT REAVILLE NJ BACK BK TRIB NEAR RINGDES NJ SB RARITAN R AT SOUTH BRANCH NJ	HOLLAND BK AT READINGTON NJ NB RARITAN R NR CHESTER NJ NB RARITAN R NR FAR HILLS NJ NB RARITAN R AT BURNT MILLS NJ LAMINGTON RIVER AT SUCCASUNNA, NJ	LAMINGTON (BLACK) R NR IRONIA NU LAMINGTON (BLACK) R NR POTTERSVILLE NU UPPER COLD BK NR POTTERSVILLE NU LAMINGTON R AT LAMINGTON NU LAMINGTON (BLACK) R NR WHITEHOUSE NU	ROCKAWAY C NR POTTERSTOWN NJ SB ROCKAWAY C TR AT LEBANDN NJ SB ROCKAWAY C AT WHITEHOUSE NJ ROCKAWAY C AT MILL RD AT WHITEHOUSE NJ	
HYDROLOGIC Unit Code	02030104 02030104 02030104 02030104	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	

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BASIN DESCRIPTOR	004	004 124 123	004 004 004	0000 4 4 4 4 4	0000 44444	004 004	004 004 003	
DRAINAGE AREA	37.10 97.60 100.00 174.00	190.00 474.00 4.19 490.00	15.00 43.40 65.80 1.78 2.57	17.00 1.99 2.52 26.50 26.50	1.28 .60 3.83 44.50 5.21	9.00 172.00 27.60 258.00 271.00	. 29 1. 20 785. 00 804. 00	
TYPE OF	******	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N	
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3TAT2	034 034 034 034 034	034 034 034 034	034 034 034 034	034 034 034 034	034 034 034 034	034 034 034 034	034 034 034 034	
LONGITUDE	19 0744411 0 24 0744317 0 20 0744202 0 34 0744113 0 30 0744027 0	0744045 0743810 0744000 0743502 0743403	0742822 0743631 0743651 0744933 0744807	0744714 0744750 0744648 0744605 0744538	0744529 0744522 0744439 0744056 0744006	0743659 0743715 0743902 0743434 0743519	0744024 0743905 0743254 0743141	
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STATION NAME AND LOCATION	ROCKAWAY C AT WHITEHOUSE NJ ROCKAWAY C AT ISLAND RD AT WHITEHOUSE. NJ LAMINGTON R AT LAMINGTON RD NR NORTH BRANCH LAMINGTON (BLACK) R AT BURNT MILLS NJ NB RARITAN R AT NORTH BRANCH NJ	NB RARITAN R NR RARITAN NJ PETERS BK NR RARITAN NJ RARITAN R AT MANVILLE NJ	MILLSTONE R AT APPLEGARTH NJ MILLSTONE R AT GROVERS MILL NJ MILLSTONE R AT PLAINSBORD NJ WOODSVILLE BK AT WOODSVILLE NJ STONY BK TR 3 NR HOPEWELL NJ	STONY BK AT GLENMODRE NJ BALDWIN C AT PENNINGTON NJ BALDWIN C AT BALDWIN LK NR PENNINGTON NJ STONY BK AT PENNINGTON NJ HART BK NR PENNINGTON NJ	HONEY B NR MOUNT ROSE NJ HONEY B TR NR PENNINGTON NJ HONEY B NR ROSEDALE NJ STONY BK AT PRINCETON NJ DUCK POND RN AT CLARKSVILLE NJ	HEATHCOTE BK AT KINGSTON NJ MILLSTONE R AT KINGSTON NJ BEDEN BK NR ROCKY HILL NJ MILLSTONE R AT BLACKWELLS MILLS NJ MILLSTONE R AT WESTON NJ	ROYCE BK TR AT FRANKFORT NJ ROYCE BK TR NR BELLE MEAD NJ RARITAN R BL CALCO DAM AT BOUND BROOK NJ PAPITAN P AT MJEENS BRINGE AT BOUND BROOK NJ	
HYDROLOGIC Unit Code	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030105 02030105 92939195	

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BASIN Descriptor	004	014	014 004 124	000 004 014 014	124	004 004 124 124	014	
DRAINAGE AREA	6.23 9.75 65.00	12.40 34.40 42.00 29.10 4.94	44.10 40.70 43.90 94.60 95.90	1101.00 27.00 75.00 290.00	3076.00	28.20 65.10 3850.00 4150.00	126.00 7.16 177.00	
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3TAT2	034 034 034 034	034 034 034 034 034	034 034 034 034 034	034 036 036 036 042	042 042 042 042	034 034 034 042	042 034 034 034	
LONGITUDE	0742410 074255 074255 0743132 0743224	0742938 0742705 0742445 0742135	0742255 0742327 0742326 0742208 0742143	0741730 0731329 0731700 0724114 0751021	0744150 0744817 0745048 0745250 0750015	0744856 0745709 0750509 0750810 0750555	0751821 0745715 0750225 0750518	
LATITUDE	403953 403653 403812 403812	402458 402700 402859 401921 402053	402322 402322 402326 402422 402500	403031 405058 403800 405449 412834	412214 411919 411740 411330 410552	411200 410624 410042 405840 405530	405844 405851 405514	
STATION NAME AND LOCATION	GREEN BK AT SEELEY MILLS NJ GREEN BK AT PLAINFIELD NJ STONY BK AT WATCHUNG NJ BOUND BK AT SOUTH BOUND BROOK NJ	LAWRENCE BK,DAVIDSONS MILL RD NR PATRICKS CO LAWRENCE BK AT FARRINGTON DAM NJ LAWRENCE BK AT WESTONS MILLS NJ MATCHAPONIX BK NR ENGLISHTOWN NJ BARCLAY BK NR ENGLISHTOWN NJ	MATCHAPONIX BK AT MUNDY AVE AT SPOTSWOOD NJ MANALAPAN BK AT SPOTSWOOD NJ MANALAPAN BK AT BRIDGE ST AT SPOTSWOOD NJ SOUTH R AT OLD BRIDGE NJ SOUTH R BL DUHERNAL DAM AT OLD BRIDGE NJ	RARITAN R AT PERTH AMBOY NJ NISSEQUOGUE RIVER NEAR SMITHTOWN NY OAK BEACH INN NY PECONIC RIVER AT RIVERHEAD NY LACKAWAXEN RIVER AT HAWLEY PA	DELAWARE R AT PORT JERVIS NY SAWKILL CREEK AT MILFORD, PA. RAYMONDSKILL C. NR. SILVER SPRING, PA. DINGMANS C AT DINGMANS FERRY PA LITTLE BUSHKILL CREEK AT BUSHKILL, PA.	BIG FLAT BK AT TUTTLES CORNER NJ FLAT BK NR FLATBROOKVILLE NJ DELAWARE R NR DELAWARE WATER GAP, PA. DELAWARE R AT DUNNFIELD NJ	BROADHEAD 2 "UPPER" SITE PA466 PAULINS KILL AT BLAIRSTOWN NJ Y YRDS C NR BLAIRSTOWN NJ PAULINS KILL AT MOUTH AT COLUMBIA NJ	
HYDROLOGIC Unit Code	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030105 02030105 02030105	02030105 02030201 02030202 02030202 02040103	02040104 02040104 02040104 02040104	02040104 02040104 02040104 02040104	02040104 02040105 02040105 02040105	

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DRAINAGE AREA	4380.00	108.00 36.20 158.00 4717.00 14.20 33.40	. 000.00	9.75 6420.00 97.40 6598.00	26.60 14.90 6680.00 5.28 6780.00	12.50 34.30 38.60 89.40	322.00 889.00 80.80	
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3TAT2		034 034 034 034 034		034 034 042 034 042	034 034 034 034	034 034 034 034 042	042 042 042 042	
LONGITUDE	0750506 0745602	075845 0750248 0750444 0751215 0751013 0750107	0744407 0745032 0750340 0751120 0750544	0750409 0750355 0750701 0743708 0750216	0745913 0745654 0745657 0745641	0743338 0744020 0744207 0744458 0753554	0754545 0753612 0752900 0754119	
LATITUDE	404944 405106	404943 405040 404945 404130 404038 404555 404557	405510 404848 404020 403532 403406	403253 403134 402601 402224 402427	402441 402251 402153 402151 401318	401305 401611 401606 401327 404822	4 10225 404525 403456 403955	
STATION NAME AND LOCATION	DELAWARE R NR RICHMOND PA (BELVIDERE NJ) PEQUEST RIVER AT TOWNSBURY, NJ	PEQUEST R AT PEQUEST NJ BEAVER BK NR BELVIDERE NJ PEQUEST R AT BELVIDERE NJ DELAWARE R AT NORTHAMPTON ST AT EASTON PA LOPATCONG C AT PHILLIPSBURG NJ BRASS CASTLE C NR WASHINGTON NJ POHATCONG C AT NEW VILLAGE NJ	MUSCONETCONG R AT LOCKWOOD NU MUSCONETCONG R AT BEATTYSTOWN MUSCONETCONG R NR BLOOMSBURY NU MUSCONETCONG R AT RIEGELSVILLE NU HAKIHOKAKE C AT MILFORD NU	HARIHDKAKE C NR FRENCHTOWN NJ DELAWARE R AT FRENCHTOWN NJ TOHICKON CREK NEAR PIPERSVILLE, PA. DELAWARE AND RARITAN CA AT KINGSTON NJ DELAWARE R AT LUMBERVILLE PA	WICKECHEDKE C AT STOCKTON NJ ALEXAUKEN C NR LAMBERTVILLE NJ DELAWARE R AT LAMBERTVILLE NJ SWAN CK AT LAMBERTVILLE NJ DELAWARE R AT TRENTON NJ	ASSUNPINK C AT CARSONS MILLS NJ ASSUNPINK C NR CLARKSVILLE NJ ASSUNPINK C AT BAKERSVILLE NJ ASSUNPINK C AT TRENTON NJ AQUASHICOLA C AT PALMERTON PA	LEHIGH RIVER AT TANNERY, PA. LEHIGH RIVER AT WALNUTPORT, PA. LITTLE LEHIGH CREEK NEAR ALLENTOWN, PA. JORDAN CR NR PLEASANT CORNERS, PA.	
HYDROLOGIC Unit Code	02040105 02040105	02040105 02040105 02040105 02040105 02040105	02040105 02040105 02040105 02040105	02040105 02040105 02040105 02040105	02040105 02040105 02040105 02040105	02040105 02040105 02040105 02040105	02040106 02040106 02040106 02040106	

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BASIN Descriptor	004	88 82 88 44 44 44	0 000 4 4 4 4	33333	014	004 003	600 600	
DRAINAGE AREA	89	83.60 94.50 17.20 25.80	20.00 14.50 10.60 7.00 37.20	5.08 13.20 2.17 5.34 7.13	44.40 53.30 47.90 19.50 2.31	4.12 8.00 9.15 37.90	42.80 3.35 12.80 9.16	
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LATITUDE	403934 403730 404035	23 42 33 43 43 43 43 43 43 43 43 43 43 43 43	400702 400814 400601 400325 400419	400755 400410 400522 400501 400345	395523 395622 395416 395804 395305	395810 400153 400158 400209 400523	400504 400319 395707 395630	
STATION NAME AND LOCATION	SWITZER CREEK NR PLEASANT CORNERS, PA. LYON CREEK AT LYON VALLEY, PA. MILL CR NR SCHNECKSVILLE, PA.	JORDAN CREEK NEAR SCHNECKSVILLE, PA JORDAN CREEK AT ALLENTOWN, PA. TULPEHOCKEN CR AT BERNVILLE, PA. CROSSWICKS C AT EXTONVILLE CROSSWICKS C AT GROVEVILLE NJ DOCTORS C AT ALLENTOWN NJ DOCTORS C AT RT 130 AT YARDVILLE NJ	BLACKS C AT MANSFIELD SQUARE NJ BLACKS CK AT BORDENTOWN NJ CRAFTS C AT HEDDING NJ ASSISCUNK C AT COLUMBUS NJ ASSISCUNK C NR BURLINGTON NJ	POQUESSING CREEK AT TREVOSE ROAD, PHILA PA POQUESSING CR ABOVE BYBERRY CR AT PHILA PA WALTON RUN AT PHILADELPHIA, PA. BYBERRY CREEK AT CHALFONT ROAD, PHILA PA. BYBERRY CREEK AT GRANT AVE PHILA PA.	SB RANCOCAS C AT RETREAT SB RANCOCAS C AT VINCENTOWN NJ SWB RANCOCAS C AT RT 70 AT MEDFORD NJ NB RANCOCAS C AT BROWNS MILLS NJ MCDONALDS B IN LEBANON STATE FOREST NJ	NB RANCOCAS C AT PEMBERTON NJ MILL CREEK NEAR WILLINGBORO NJ MILL C AT WILLINGBORO NJ MILL CREEK AT LEVITT PKY AT WILLINGBORO NJ PENNYPACK CREEK AT PINE RD., PHILADELPHIA, P	PENNYPACK CREEK BELOW VEREE ROAD AT PHILA., WOODEN BRIDGE RUN AT PHILA., PA. NB PENNSAUKEN C NR MOORESTOWN NJ SB PENNSAUKEN C AT CHERRY HILL NJ	
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STATION NAME AND LOCATION	TACONY CREEK AT COUNTY LINE, PHILADELPHIA, P FRANKFORD CREEK AT TORRESDALE AVE., PHILA., COOPER R AT NORCROSS RD AT LINDENWOLD NJ COOPER R AT KIRKWOOD NJ COOPER R AT LAWNSIDE NJ	COOPER R AT HADDONFIELD NU COOPER R AT CAMDEN NU SB BIG TIMBER C AT BLACKWOOD TERRACE NU SB BIG TIMBER C AT BLACKWOOD NU NB BIG TIMBER C AT GLENDORA NU	MANTUA C AT PITMAN NJ MANTUA C AT SEWELL NJ MANTUA C AT MANTUA NJ DARBY CREEK AT WATERLOO MILLS NEAR DEVON, PA DARBY CREEK NEAR DARBY, PA.	COBBS CR AT U.S. HGHWY NO. 1 AT PHILA PA. COBBS CR BLW INDIAN CR NR UPPER DARBY, PA. COBBS CREEK AT DARBY, PA. EAST BRANCH CRUM CREEK NEAR PAOLI, PA. WEST BRANCH CRUM CREEK NEAR PAOLI, PA.	RIDLEY CREEK NEAR GOSHENVILLE, PA. RIDLEY CREEK NEAR DUTTON MILL, PA. CHESTER CREEK NEAR WEST CHESTER, PA. CHESTER CREEK NEAR MILLTOWN, PA. CHESTER CREEK AT WESTTOWN SCHOOL, PA.	GOOSE CREEK NEAR WEST CHESTER, PA. RACCOON C NR MULLICA HILL NJ RACCOON C NR SWEDESBORD NJ SB MILL CK AT RANCOCAS NJ MILL CK TR NO 2 AT RANCOCAS NJ	MILL C TR 2 AT WOODLANE RD AT WILLINGBORO NJ SB MILL CK AT LEVITT PARKWAY AT WILLINGBORO MILL CK AT WILLINGBORO PARKWAY AT WILLINGBOR MILL CK TRIB AT NORTHAMPTON DR AT WILLINGBOR	
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LATITUDE	403803 400649 395534 403130	404101 403735 403605 402623 403840	403121 402813 402750 402858 402920	402923 402942 403057 403127 403155	403212 402555 402550 402550 402200	402208 401430 401150 401127 401203	401001 401001 401200 401109
STATION NAME AND LOCATION	WEST BR SCHUYLKILL R AT CRESSONA, PA. PICKERING CREEK TRIB NR KIMBERTON, PA. WEST BRANCH BRANDYWINE CREEK AT WAWASET, PA. MAIDEN C NR VIRGINVILLE PA SCHUYLKILL RIVER AT PORT CARBON, PA.	SCHUYLKILL RIVER AT POTTSVILLE, PA. SCHUYLKILL R AT LANDINGVILLE, PA. SCHUYLKILL RIVER AT AUBURN, PA. LITTLE SCHUYLKILL RIVER AT SOUTH TAMAQUA. PA. LITTLE SCHUYLKILL RIVER AT DREHERSVILLE, PA.	SCHUYLKILL RIVER AT BERNE, PA. SACONY CR AT SALLY ANN FURNACE, NR BOWERS, P LITTLE SACONY CREEK NEAR BOWERS, PA. SACONY CREEK ABOVE BOWERS, PA. SACONY CREEK BELOW BOWERS, PA.	SACONY CREEK TRIB NEAR BOWERS, PA. SACONY CREEK ABOVE KUTZTOWN, PA. SACONY CREEK AT NORMAL AVE. AT KUTZTOWN, PA. SACONY CREEK AT KUTZTOWN, PA. SACONY CREEK BELOW KUTZTOWN, PA.	SACONY CR AT GREENWICH BRIDGE, NR KUTZTOWN, MAIDEN CREEK NEAR EAST BERKLEY, PA. NORTHKILL CR AT BERNVILLE, PA. NORTHKILL CR AT BERNVILLE, PA. TULPEHOCKEN CR, BL MARSH DAMSITE NR READING.	TULPEHOCKEN CREEK NEAR READING, PA. SCHUYLKILL RIVER AT POTTSTOWN, PA. PIGEON CREEK NEAR BUCKTOWN, PA. PIGEON CREEK NEAR PORTERS MILL, PA. PIGEON CREEK NEAR PARKER FORD, PA.	STONY RUN NEAR SPRING CITY, PA. STONY RUN AT SPRING CITY, PA. FRENCH CREEK NEAR TRYTHALL, PA. FRENCH CREEK NEAR KNAURERTOWN, PA.
HYDROLOGIC Unit Code	02040203 02040203 02040203 02040203 02040203	02040203 02040203 02040203 02040203	02040203 02040203 02040203 02040203	02040203 02040203 02040203 02040203	02040203 02040203 02040203 02040203	02040203 02040203 02040203 02040203	02040203 02040203 02040203 02040203

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LONGITUBE	0754150 0754251	0753825 0753606 0753105 0753914 0753750 0753932 0753932	0753645 0753531 0753234 0753234 0753142	0753120 0752707 0752601 0752822 0752825	0751344 0751313 0751252 0751140 0754644	0754619 0754507 0774503 0754652 0754927	0754747 0754535 0754333 0754129	
LATITUBE	401014	400914 400905 400807 400443 400522 400603 400603	48666	402732 401346 400952 400351 400408	400141 400726 400259 395942 400548	400441 400329 411928 394939	394556 394250 395013 394911	
STATION NAME AND LOCATION	FRENCH CREEK NEAR COVENTRYV FRENCH C NR COVENTRYVILLE,	FRENCH CREEK NEAR PUGHTOWN, PA. FRENCH CREEK NEAR PHOENIXVILLE, PA. FRENCH CREEK AT PHOENIXVILLE, PA. PICKERING CREEK NEAR EAGLE, PA. PICKERING CREEK NEAR CHESTER SPRINGS, PA. UNNAMED TRIB TO PICKERING CR NR CHESTER SPS, PICKERING CR TRIB AT CHESTER SPRINGS, PA. PICKERING CR TRIB AT CHESTER SPRINGS, PA. PINE CR AT SHARP FARM NR LIONVILLE, PA.	PINE CREEK AT CHESTER SPR PIGEON RUN AT RAPPS CORNE ROCK RUN AT CHARLESTOWN, ROCK RUN AT CHARLESTOWN, PICKERING CREEK NEAR PHOE	INDIAN CREEK NR ZIONSVILLE, PA. PERKIOMEN CREEK AT GRATERFORD, PA. SKIPPACK CREEK NEAR COLLEGEVILLE, PA. LITTLE VALLEY CR NR VALLEY FORGE, PA. VALLEY CREEK NR VALLEY FORGE, PA.	SCHUYLKILL RIVER AT MANAYUNK, PHILA., PA. WISSAHICKON CR AT FORT WASHINGTON, PA. WISSAHICKON CR AT LIVEZEY LANE, PHILA., PA. SCHUYLKILL RIVER AT PHILADELPHIA, PA. EAST BR BRANDYWINE CR AT GLENMOORE, PA.		W BR WHITE CLAY CR NR CHESTERVILLE, PA. WHITE CLAY C AB NEWARK DE RED CLAY CREEK NEAR KENNETT SQUARE, PA. RED CLAY CREEK NEAR FIVE POINT, PA.	
HYDROLOGIC UNIT CODE	02040203 02040203	02040203 02040203 02040203 02040203 02040203 02040203	02040203 02040203 02040203 02040203 02040203	02040203 02040203 02040203 02040203	02040203 02040203 02040203 02040203	02040203 02040203 02040203 02040205 02040205	02040205 02040205 02040205 02040205	-

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LATITUDE	394552 400422 400017 395544	395530 400605 400541 400555	400544 400425 400430 400334 400308	400358 400205 400020 395831 395531	395209 394609 394645 392942 392821	392554 394157 393836 401236	401233 401134 401047 401001	
STATION NAME AND LOCATION	RED CLAY C AT WOODDALE DE WEST BR BRANDYWINE CREEK NEAR HONEY BROOK, P W BR BRANDYWINE CR NR COATESVILLE, PA. BUCK RUN NEAR DOE RUN, PA.	UDE KUN NEAK SPRINGUALE, PA. WB BRANDYWINE C 2.7 MILES SW OF WESTCHESTER, E BR BRANDYWINE CR NR STRUBLE DAM, PA. EAST BRANCH BRANDYWINE CREEK NEAR CUPOLA, PA EAST BR BRANDYWINE CR AT CUPOLA, PA. EAST BR BRANDYWINE TRIB NR CUPOLA, PA.	EB BRANDYWINE C NR GLENMOORE PA EAST BR. BRANDYWINE CREEK NEAR GLENMOORE, PA INDIAN RUN NEAR SPRINGTON, PA. EAST BR BRANDYWINE CR AT LYNDELL, PA. EAST BR BRANDYWINE CR NR DORLAN, PA.	MARSH CREEK NR LYNDELL, PA. EAST BR BRANDYWINE CR NR DOWNINGTOWN, PA. EAST BR BRANDYWINE CR AT DOWNINGTOWN, PA. VALLEY CREEK AT MULLSTEINS MEADDWS, PA. EAST BRANCH BRANDYWINE CREEK AT WAWASET, PA.	BRANDYWINE CREEK AT CHADDS FORD, PA. BRANDYWINE C AT WILMINGTON DE ELK CREEK NEAR OXFORD, PA. MAURICE R AT NORMA NJ COHANSEY R AT SEELEY NJ	COHANSEY R AT BRIDGETON NJ OLDMANS C AT PORCHES MILL NJ SALEM R AT WOODSTOWN NJ MANASQUAN R NR GEDRGIA NJ DEBOIS C AT ADELPHIA NJ	DEBDIS C AT WYCKOFF MILLS NU MANASQUAN R AT WEST FARMS NU MANASQUAN R TR NR FARMINGDALE NU MARSH BOG BK AT SQUANKUM NU	
HYDROLOGIC Unit Code	02040205 02040205 02040205 02040205	02040205 02040205 02040205 02040205 02040205	02040205 02040205 02040205 02040205	02040205 02040205 02040205 02040205	02040205 02040205 02040205 02040206 02040206	02040206 02040206 02040206 02040301 02040301	02040301 02040301 02040301 02040301	

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BASIN Descriptor	004 004 004	124 004 004 004	004	004 124 003 003	0003 003 004	000 4 4 4 4 4 4 4 4	0014 000 004	
DRAINAGE AREA	43.40 6.20 5.52 34.90	124.00 7.43 16.00 26.70 46.10	9.60 70.50 84.10 85.90 64.00	8.11 16.60 15.10	.52 7.74 37.30 56.30 154.00	30.80 22.30 982.00 199.00 520.00	2086.00 2232.00 593.00 10.40	
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LONGITUDE	0740921 0740942 0741717 0740910 0740652	0741329 0741502 0741911 0744337 0743955	0744305 0743900 0743254 0743228 0743126	0742630 0743935 0743116 0745705 0745739	0745701 0745625 0745449 0745106 0744647	0744915 0745800 0751901 0751925 0752423	0754433 0754812 0754618 0760738	
LATITUDE	400947 401138 401052 400530 395656	395910 394754 393955 394425	393802 393833 394117 394030 393947	393723 393825 392545 394402 394331	394217 394147 394009 393542 393050	391825 392512 421917 423835 422240	415748 420207 421928 423004	
STATION NAME AND LOCATION	MANASQUAN R AT SQUANKUM NJ MINGAMAHONE BK AT FARMINGDALE NJ NB METEDECONK R NR WYCKOFF MILLS N. J. NB METEDECONK R NR LAKEWDOD NJ BARNEGAT BAY AT BAY SHORE NJ	TOMS R NR TDMS RIVER NU OVSTER C NR BRDOKVILLE NU WESTECUNK C AT STAFFORD FORGE NU MULLICA R AT OUTLET OF ATSION LK AT ATSION N MULLICA R NR BATSTD NU	HAMMONTON CK AT WESCDATVILLE NJ BATSTD R AT BATSTD NJ WEST BRANCH WADING RIVER NEAR JENKINS NJ WB WADING R AT MAXWELL NJ DSWEGO R AT HARRISVILLE NJ	EB BASS R NR NEW GRETNA NJ MULLICA R AT PLEASANT MILLS NJ ABSECON C AT ABSECON NJ GREAT EGG HARBOR R NR SICKLERVILLE NJ GREAT EGG HARBOR R TR AT SICKLERVILLE NJ	GREAT EGG HARBOR R TR 2 AT WINSLOW CROSSING FOURMILE B AT NEW BROOKLYN NJ GREAT EGG HARBOR R NR BLUE ANCHOR NJ GREAT EGG HARBOR R AT FOLSOM NJ GREAT EGG HARBOR R AT WEYMOUTH NJ	TUCKAHDE R AT HEAD OF RIVER NJ MANANTICO C NR MILLVILLE NJ SUSQUEHANNA RIVER AT UNADILLA, N.Y. UNADILLA RIVER NEAR NEW BERLIN, N.Y. UNADILLA RIVER AT ROCKDALE, N. Y.	SUSQUEHANNA R NR. GREAT BEND, PA. SUSQUEHANNA RIVER AT CONKLIN, N.Y. CHENANGO RIVER AT GREENE, N. Y. GRIDLEY CREEK ABOVE EAST VIRGIL NY	
HYDROLOGIC UNIT CODE	02040301 02040301 02040301 02040301	02040301 02040301 02040301 02040301	02040301 02040301 02040301 02040301	02040301 02040301 02040302 02040302	02040302 02040302 02040302 02040302	02040302 02040302 02050101 02050101	02050101 02050101 02050102 02050102	

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DRAINAGE AREA	-	4773.00	57.50	1.81 153.00 12.20	186.00 10.20 76.80 282.00 74.20	122.00 131.00 446.00	66.50 266.00 298.00 771.00	158.00 340.00 1377.00	
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LONGITUDE	63026	070253 0770253 0770223	0770341 0770353 0770409 0765630 0770253	0770125 0770341 0770421 0770444 0770054	0770613 0765755 0770715 0770747	0770855 0770842 0770658 0773417	0773118 0772655 0771435 0770906	0773905 0772505 0771403 0770745	
LATITUDE	158	420/40 415905 413932 413947	414017 414100 414131 414041 413932	414016 414017 414021 414734 414727	415030 414854 415255 415430 415035	415458 415455 415727 415455	415533 415805 415825 415904 420144	421850 421320 420625 420715	
STATION NAME AND LOCATION	SUSQUEHANNA	UWEGU CKEEK NEAK UWEGU, SUSQUEHANNA RIVER NEAR 1 TIOGA RIVER ABOVE MORRI! MORRIS RUN NEAR BLOSSBUI	CDAL CREEK AT BLOSSBURG, PA. BEAR CREEK AT BLOSSBURG, PA. TIOGA RIVER AT BLOSSBURG, PA. TIOGA R AT COUNTY BRIDGE, PA.	MORRIS RN NR MORRIS RUN, PA CDAL RUN AT BLOSSBURG, PA JOHNSON C AT BLOSSBURG, PA TIOGA RIVER NEAR MANSFIELD, PA.	TIDGA RIVER AT LAMBS CREEK, PA. ELK RUN NEAR MAINESBURG, PA. MILL CR NR TIDGA, PA. TIDGA RIVER AT TIDGA, PA. CROOKED CREEK AT MIDDLEBURY CENTER, PA.	CROOKED CREEK AT TIOGA, PA. CROOKED CR AT TIOGA, PA. TIOGA RIVER AT TIOGA JUNCTION, PA. COWANESQUE RIVER AT WESTFIELD, PA. MILL CREEK AT WESTFIELD, PA.	COWANESQUE RIVER AT COWANESQUE, PA. TROUPS CREEK AT KNOXVILLE, PA. COWANESQUE RIVER AT NELSON, PA. COWANESQUE RIVER AT LAWRENCEVILLE, PA. TIOGA RIVER AT LINDLEY NY	CANISTEO RIVER BELOW CANACADEA CR AT HORNELL CANISTEO RIVER AT WEST CAMERON, N. Y. CANISTEO RIVER AT ADDISON NY TIOGA RIVER NEAR ERWINS, N. Y.	
HYDROLOGIC Unit Code	02050103	02050103 02050103 02050104 02050104	02050104 02050104 02050104 02050104	02050104 02050104 02050104 02050104	02050104 02050104 02050104 02050104	02050104 02050104 02050104 02050104	02050104 02050104 02050104 02050104	02050104 02050104 02050104 02050104	

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LONGITUBE	0780936 0780919 0781606 0781226	0781238 0780600 0783500 0783602 0783430	0783414 0782937 0782722 0782348 0782348	0782305 0781547 0781646 0781847 0782208	0781928 0781333 0781029 0781150 0781311	0781324 0780503 0780128 0775416	0773922 0774934 0775130 0774128	
LATITUBE	410325 410323 405012 405204 405211	405517 410915 411027 411140	411224 411629 411642 411721 411927	411850 412120 412247 413202 412838	412837 413716 412708 412448 412524	412519 411909 412406 411716	413849 412833 411857 412322	
STATION NAME AND LOCATION	ROLLING STONE RN NR ROLLING STONE, PA MOWRY RN AT ROLLING STONE, PA TROUT RN AT EDENDALE, PA COLD STREAM ABOVE GLASS CITY, PA COLD STREAM AT PHILIPSBURG, PA	EMIGH RN AT HAWK RUN, PA SALTLICK RN NR POTTERSDALE, PA S BR BENNETT BR SINNEMAHONING C NR PENFIELD. MOUNTAIN RN NR PENFIELD, PA WILSON RN NR PENFIELD, PA	MOOSE RN AT PENFIELD, PA KERSEY RN AT WEEDVILLE, PA LAUREL RN NR WEEDVILLE, PA BENNETT BR SINNEMAHONING C AT MEDIX RUN, PA SPRING RN NR WEEDVILLE, PA	TROUT RN AT BENZETTE, PA DENTS RN AT DENTS RUN, PA E BR HICKS RN NR HUSTON HILL, PA DRIFTWOOD BR SINNEMAHONING C NR LOCKWOOD, PA BIG RN AT TRUMAN, PA	WEST CREEK AT HOWARD SIDING PA PARKER RUN AT GARDEAU, PA HUNTS RN AT CAMERON, PA DRIFTWOOD BR SINNEMAHONING CR, STERLING RUN, STERLING RN NR STERLING RUN, PA	TANNERY HOLLOW RN NR STERLING RUN, PA SINNEMAHONING CREK AT SINNEMAHONING, PA. F FORK SINNEMAHONING CR NR SINNEMAHONING, PA COOKS RN NR KEATING, PA CROWLEY HOLLOW NR KEATING, PA	GERMANIA BRANCH AT GERMANIA, PA. KETTLE CREEK AT CROSS FORK, PA. TWOMILE RN NR WESTPORT, PA YOUNG WOMANS CREEK NEAR RENOVO, PA.	
HYDROLOGIC Unit Code	02050201 02050201 02050201 02050201 02050201	02050201 02050201 02050202 02050202	02050202 02050202 02050202 02050202	02050202 02050202 02050202 02050202	02050202 02050202 02050202 02050202 02050202	02050202 02050202 02050202 02050203 02050203	02050203 02050203 02050203 02050203	

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DRAINAGE AREA	31. 36. 87. 399.	44. 12. 13.	. .	. 22	37. 129. 604.	22. 5. 37. 173. 443.	20.	
TYPE OF SITE	3 3 3 3 S	*****	N N N N N N N N N N N N N N N N N N N	A A A A A	N N N N N	SESES	N N N N	
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LONGITUDE	0773630 0773253 0774740 0774712	0773622 0775415 0771739 0771826	0771813 0771812 0771743 0771807 0771807	0771840 0771821 0771738 0771809	0771929 0772046 0772242 0772652 0770606	0770902 0770903 0771352 0770159 0765443	0765150 0765001 0765245 0765739	
LATITUDE	411445 411032 405323 405635 410306	410334 410130 413543 413851 413800	413746 413743 413732 413726 413706	413705 413713 413650 413636	413623 413456 413321 413118 413404	412943 412939 412825 412506 411931	410453 410428 405802 403214	
STATION NAME AND LOCATION	BAKER RN NR HYNER, PA TANGASCOOTACK CREEK NEAR LOCK HAVEN, PA. SPRING CREEK NEAR AXEMANN, PA. BALD EAGLE CR BLW SPRING CR AT MILESBURG, PA BALD EAGLE CREEK AT BLANCHARD, PA.	MARSH CREEK AT BLANCHARD, PA. SOUTH FORK BEECH CREEK NEAR SNOW SHOE, PA. BABB C AT MORRIS, PA WILSON CREEK ABOVE SAND RUN NEAR ANTRIM, PA BACKSWITCH MINE DISCHARGE AT ANTRIM, PA	MITCHELL MINE DISCHARGE #1 NEAR ANTRIM, PA MITCHELL MINE DISCHARGE #2 NEAR ANTRIM, PA BRIDGE RUN AT MOUTH AT ANTRIM, PA ANNA S MINE DISCHARGE #1 NEAR ANTRIM, PA BASSWOOD RUN NEAR ANTRIM, PA	HUNTER DRIFT DISCHARGE NEAR ANTRIM, PA ANNA S MINE DISCHARGE #2 NEAR ANTRIM, PA BASSWOOD RN AT MOUTH NR ANTRIM, PA RATTLER RUN NEAR MORRIS, PA WILSON C AT MORRIS, PA	UNNAMED TRIBUTARY TO PAINT RUN NEAR MORRIS. STONY FK NR MOUTH NR BLACKWELL, PA BABB CREEK AT BLACKWELL, PA PINE CREEK AT CEDAR RUN, PA. BLOCKHOUSE CR TRIB AT LIBERTY, PA.	BLOCKHOUSE CR AT BUTTONWOOD, PA. STEAM VALLEY RUN AT BUTTONWOOD, PA. BLOCKHOUSE CREEK NEAR ENGLISH CENTER, PA. LYCOMING CREEK NEAR TROUT RUN, PA.	WEST BR SUSQUEHANNA R. AT WATSONTOWN, PA. WARRIOR RUN AT MCEWENSVILLE, PA. WEST BRANCH SUSQUEHANNA RIVER AT LEWISBURG, WICONISCO C AT MILLERSBURG	
HYDROLOGIC Unit Code	02050203 02050203 02050204 02050204	02050204 02050204 02050205 02050205	02050205 02050205 02050205 02050205 02050205	02050205 02050205 02050205 02050205 02050205	02050205 02050205 02050205 02050205 02050205	02050205 02050205 02050205 02050206 02050206	02050206 02050206 02050206 02050301	

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DRAINAGE AREA	18300.00	301.00 162.00 816.00 172.00 756.00	164.00 205.00 3354.00	15.00 200.00 470.00	. 77. . 76. . 70 65	24100.00 1.85 216.00 337.00	510.00
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COUNTY	043 109 109 109	119 097 061 009 009	061 087 061 099 043	041 099 041 041	04 1 0 0 4 1 0 4 1 0 4 1	043 043 041 075	133 071 071 133
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LONGITUDE	0765443 0765211 0765120 0765821	0770255 0765443 0780109 0782934 0781556	0775900 0773500 0775532 0770746	0770611 0772409 0771009 0770208	0765938 0765835 0765755 0765751	0765312 0764946 0765354 0763439 0763132	0764307 0762129 0763133 0764237
LATITUDE	403640 404629 404850 405115	405200 403640 402905 400418	402717 403917 401245 402842 401128	401536 402215 401924 401510 401508	401727 401721 401744 401747 401805	401527 401641 401329 402409 401937	400452 395334 400319 400037
STATION NAME AND LOCATION	MAHANTANGO C NR DALMATIA MIDDLE C NR SELINSGROVE PENNS C NR SELINSGROVE SUSQUEHANNA RIVER AT SUNBURY, PA. SHAMOKIN CR NR SHAMOKIN (SHAMOKIN A), PA.	PENNS CREEK AT PENNS CREEK, PA. EAST MAHANTANGO CREEK NEAR DALMATIA, PA. JUNIATA RIVER AT HUNTINGDON, PA. DUNNING CREEK AT BELDEN, PA. RAYSTOWN BRANCH JUNIATA RIVER AT SAXTON, PA.	RAYSTOWN BR JUNIATA RIVER AT ARDENHEIM, PA. KISHACOQUILLAS CREEK AT REEDSVILLE, PA. AUGHWICK CREEK NEAR THREE SPRINGS, PA. JUNIATA RIVER AT NEWPORT, PA. SWATARA C NR MIDDLETOWN	CONODOGUINET C BL CARLISLE BIXLER RUN NR LOYSVILLE, PA. SHERMAN CREEK AT SHERMANS DALE, PA. CONODOGUINET CR AT WLOW ML BG NR HOGESTOWN, CONODOGUINET CREEK NR HOGESTOWN, PA.	CONDDOGUINET CREEK TRIB NO. 1 NR ENDLA, PA. CONDDOGUINET CR. TRIB. NO. 2 NR. ENDLA, PA. CONDDOGUINET CR. TRIB. NO. 2A NR. ENDLA, PA. CONDDOGUINET CR. TRIB. NO. 2B NR. ENDLA, PA. CONDDOGUINET CREEK TRIB. NO. 3 NR ENDLA, PA.	SUSQUEHANNA RIVER AT HARRISBURG, PA. SPRING CREEK TRIBUTARY NEAR HARRISBURG, PA. YELLOW BREECHES CREEK NEAR CAMP HILL, PA. SWATARA CREEK AT HARPER TAVERN, PA.	WEST CONEWAGO CREEK NEAR MANCHESTER, PA. PEQUEA C LANCASTER CO CHICKIES C DONEGALTWP LAN CO CODORUS C BL YORK
HYDROLOGIC Unit Code	02050301 02050301 02050301 02050301	02050301 02050301 02050302 02050303 02050303	02050303 02050304 02050304 02050304 02050305	02050305 02050305 02050305 02050305	02050305 02050305 02050305 02050305	02050305 02050305 02050305 02050305	02050305 02050306 02050306 02050306

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BASIN BOT9183230	0004	124	004	003 004 004	004 004 004	124 004 014 124	024
DRAINAGE AREA	1.26 2.20 117.00	324.00 42.80 1.63 72.90	20.40 1.56 148.00 133.00 27100.00	10.90 10.00 31.00 94.40	9.90 . 15 1.47 285.00 113.00	348.00 73.00 225.00 106.00	72.40 146.00 247.00 595.73
40 39YT 3T12	X X X X X X X X X X X X X X X X X X X	X X X X X X X X X X X X X X X X X X X	M M M M M M M M M M M M M M M M M M M	N N N N N N N N N N N N N N N N N N N	M M M M M M M M M M M M M M M M M M M	M M M M M M M M M M M M M M M M M M M	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
COUNTY	133 071 001 133	071 071 071 071	071 071 071 133 025	025 029 029 029	029 005 005 027 011	003 005 023 023	001 000 001 057
STATE	042 042 042 042	042 042 042 042 042	042 042 042 042 024	024 042 042 042 024	042 024 024 024 024	024 010 024 024	024 0024 054 054
LONGITUDE	0764307 0762158 0770855 0770833	0761639 0760412 0761016 0761112	0761428 0761906 0761943 0761858 0761031	0761028 0755929 0755906 0755944	0755404 0764213 0764042 0764734 0754710	0764136 0751439 0791826 0791055 0790725	0790242 0784300 0784718 0785025
LATITUBE	400452 395741 400118 400204 395514	400300 400104 400001 400021 395600	395628 395428 395421 394621 393926	393931 395652 395617 395444 393749	394845 392907 392845 391836 385950	385721 383250 391807 392338 393005	392938 394843 394007 393359
STATION NAME AND LOCATION	W CONEWAGO C AB YORKHAVEN CONESTOGA C BL LANCASTER LATIMORE CREEK TRIB NR YORK SPRINGS, PA. N FORK LATIMORE CR TRIB NR YORK SPRINGS, PA. SOUTH BRANCH CODORUS CREEK NEAR YORK, PA.	CONESTOGA RIVER AT LANCASTER, PA. PEQUEA CREEK NEAR VINTAGE, PA PEQUEA CREEK TRIBUTARY NEAR STRASBURG, PA PEQUEA CREEK AT STRASBURG, PA BIG BEAVER CREEK TRIBUTARY AT NEW PROVIDENCE	BIG BEAVER CREEK AT REFTON, PA PEQUEA CREEK TRIBUTARY NEAR MARTIC FORGE, PA PEQUEA CREEK AT MARTIC FORGE, PA. MUDDY CREEK AT CASTLE FIN, PA. SUSQUEHANNA RIVER AT CONOWINGO, MD.	SUSQUEHANNA R AT CONDWINGO MD OCTORARO CR NR ATGLEN, PA. VALLEY CREEK NR ATGLEN, PA. OCTORARO CR NR ATGLEN, PA. DEER CREEK AT ROCKS, MARYLAND	ELK CREEK AT ELKVIEW, PA. BAISMAN RN AT SHAWAN, MD BAISMAN RUN AT BROADMOOR, MD. PATAPSCO RIVER AT HOLLOFIELD, MD. CHOPTANK RIVER NEAR GREENSBORO, MD.	PATUXENT RIVER NEAR BOWIE, MD. FY78 REESTABLISH GWDC 74971 TO NORTH BRANCH POTOMAC RIVER AT STEYER, MD. N B POTOMAC R AT KITZMILLER, MD. SAVAGE R. BEL SAVAGE R. DAM NR BLOOMINGTON,M	GEORGES CREEK AT FRANKLIN, MD. WILLS C BL HYNDMAN, PA WILLS CREEK NEAR CUMBERLAND, MD. NORTH BRANCH POTOMAC RIVER AT PINTO, MD.
HYDROLOGIC UNIT CODE	02050306 02050306 02050306 02050306 02050306	02050306 02050306 02050306 02050306 02050306	02050306 02050306 02050306 02050306 02050306	02050306 02050306 02050306 02050306 02050306	02060003 02060003 02060003 02060003	02060006 02060010 02070002 02070002	02070002 02070002 02070003 02070003

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LONGITUDE	0785025 0784624 0782728 0784331	0775000 0774807 0773628 0774352 0784518	0781240 0782011 0774722 0773325	0772218 0772216 0772204 0772013 0771038	0771456 0772043 0770740 0771406	0772350 0772000 0772240 0770702	0770609 0770600 0770712 0770225	
LATITUDE	393359 393716 393213 390318	394229 392604 394259 392701 381921	385450 385836 391655 392535	385657 385656 385710 390741 390503	390003 385548 385658 394043	393540 392455 392316 385546 390832	390659 390636 390609 385821	
STATION NAME AND LOCATION	NORTH BRANCH POTOMAC R AT PINTO, MD. NORTH BRANCH POTOMAC RIVER NEAR CUMBERLAND, POTOMAC RIVER AT PAW PAW, W. VA. LOST RIVER AT MCCAULEY NEAR BAKER, W. VA. CACAPON RIVER NEAR GREAT CACAPON, W. VA.	CONOCOCHEAGUE CREEK AT FAIRVIEW, MD. POTOMAC RIVER AT SHEPHERDSTOWN, W. VA. ANTIETAM CREEK NEAR WAYNESBORD, PA. ANTIETAM CREEK NEAR SHARPSBURG, MD. S F SHENANDOAH RIVER NEAR LYNNWOOD VA	S F SHENANDOAH RIVER AT FRONT ROYAL VA N F SHENANDOAH RIVER NEAR STRASBURG VA SHENANDOAH RIVER AT MILLVILLE, W. VA. CATOCTIN CREEK NEAR MIDDLETOWN, MD. POTOMAC RIVER AT POINT OF ROCKS MD	STAVE RUN AT RESTON VA STAVE RUN NEAR RESTON VA SMILAX BRANCH AT RESTON VA SENECA CREEK AT DAWSONVILLE, MD. WATTS BRANCH AT ROCKVILLE, MD.	POTOMAC RIVER AT GREAT FALLS MD SNAKEDEN BR AT RESTON, VA. POTOMAC RIVER NR. WASH., D.C. LITTLE FALLS P MONOCACY RIVER AT BRIDGEPORT, MD. BIG PIPE CREEK AT BRUCEVILLE, MD.	HUNTING CREEK AT JIMTOWN, MD. LINGANORE CREEK NEAR FREDERICK, MD. MONOCACY R. AT REICHS FORD BR NEAR FREDERICK POTOMAC RIVER AT CHAIN BRIDGE, WASHINGTON, DC WILLIAMSBURG RN NR OLNEY, MD	N. BR. ROCK CREEK NEAR NORBECK, MD. MANOR RUN NEAR NORBECK, MD. N BR ROCK CREEK NR ROCKVILLE, MD. ROCK CREEK AT SHERRILL DRIVE, WASHINGTON, D.	
HYDROLOGIC UNIT CODE	02070003 NDR1 02070003 PDTC 02070003 CDS 02070003 CACA	02070004 CDNC 02070004 PDTC 02070004 ANT1 02070005 S F	02070005 S F 02070006 N F 02070007 SHEN 02070008 CATG	02070008 STAVE PO2070008 SMILAX 02070008 SENECA 02070008 WATTS PO2070008 WATTS PO20700008 WATTS PO20700000 WATTS PO2070000 WATTS PO207000 WATTS PO20700 WATTS PO2	02070008 POTC 02070008 POTC 02070009 MONC 02070009 BIG	02070009 HUNI 02070009 LING 02070009 MONG 02070010 PQTC	02070010 N. E 02070010 MANG 02070010 N BR	

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3TAT2	024 024 024 024	024 024 024 024	051 051 051 051	024 051 051 051	051 051 051 051	051 051 051 051	05 05 10 05 05 05 05 05 05 05 05 05 05 05 05 05
LONGITUDE	0765534 0770115 0770311	0770308 0770148 0765800 0765842 0765912	0773316 0773414 0772757 0772452 0773414	0770325 0775209 0775755 0774850 0775831	0773105 0770948 0775703 0771957 0801225	0800954 0794045 0784930 0782930 0782930	0772149 0783810 0772832
LATITUDE	385737 390736 390705 390705	390424 390355 385709 384716	383658 385321 384916 384559	383545 384758 383530 383150 382101	38 1920 375316 375822 374603 373101	373319 373150 373210 374750	372326 372455 371328
STATION NAME AND LOCATION	N.E. BR. ANACOSTIA RIVER AT RIVERDALE, MD. N.W. BR. ANACOSTIA RIVER AT NORWOOD, MD. NURSERY RUN AT CLOVERLY MD BATCHELLORS RN AT OAKDALE, MD. BET PRE CREEK AT LAYHILL, MD.	LUTES RUN AT LUTES MARYLAND N W BR ANACGSTIA R NR COLESVILLE, MD NORTHWEST BRANCH ANACGSTIA RIVER NEAR HYATTS HENSON CREEK AT OXON HILL, MD. PISCATAWAY C NR S PISCATAWAY MD	CEDAR RUN NR ADEN, VA. BULL RUN NEAR CATHARPIN, VA. CUB RUN NR BULL RUN, VA. BULL RUN NEAR CLIFTON, VA.	MATTAWOMAN C NR POMONKEY, MD CARTER RUN NR MARSHALL VA. HAZEL RIVER AT RIXEVVILLE, VA. RAPPAHANNOCK RIVER AT REMINGTON, VA	RAPPAHANNOCK RIVER NR FREDERICKSBURG VA MATTAPONI RIVER NR BEULAHVILLE VA DESPER CR (NR MOUTH) NR MINERAL VA. PAMUNKEY RIVER NR HANDVER VA BELOW REGENERATION ON FS60416710	COLD SPRING BRANCH AT 6042 50-2 JAMES RIVER AT BUCHANAN, VA JAMES RIVER AT BENT CREEK, VA. JAMES RIVER AT SCOTTSVILLE, VA. JAMES RIVER AT CARTERSVILLE, VA	JAMES R NR DUTCH GAP VA HOLIDAY CREEK NEAR ANDERSONVILLE, VA. APPOMATTOX RIVER AT MATOACA, VA.
HYDROLOGIC Unit CODE	02070010 02070010 02070010 02070010	02070010 02070010 02070010 02070010	02070010 02070010 02070010 02070010	02070011 02080103 02080103 02080103	02080104 02080105 02080106 02080106 02080201	02080201 02080201 02080203 02080203 02080203	02080206 02080207 02080207

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DRAINAGE AREA	OIS			257.00 395.00 1789.00 257.00	2977.00 52.60 124.00 1.60 1050.00	538.00 2550.00 44.00 7.47 55.00	191.00 68 8410.00 8700.00	2.80 14.00 1421.00 617.00	
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3TAT2		045 045 045 013 013	0013	051 051 051 051	051 037 037 037	037 037 037 037	037 037 037 037	037 037 051 051	
LONGITUDE	_ 		0802348	0801234 0795620 0791744 0801234	0784428 0785221 0801811 0795126 0794945	0794554 0790523 0791213 0790548 0790622	0790142 0785405 0773718 0772302 0771038	0770805 0765730 0770959 0765355	
LATITUDE	<u> </u>		250542	371411 371530 370616 371411	365454 363226 363053 362000	363130 363832 362407 362144 362312	363102 362355 362804 361233 360102	360041 354320 364613 364545	
STATION NAME AND LOCATION	SOUTH ATLAN	LITTLE PEE DEE RIVER AT GALIVANTS FERRY, S. I FY78 CHANGE OPERATION OWDC54435 TO K SALKEHATCHIE RIVER NEAR MILEY, S.C. SAVANNAH R AT MOUTH OF AUGUSTA CA SAVANNAH R AT US 301	M SOUTH R AT SNAPPING SHDALS WITH LACOOHEE AT GA 31 WITHLACOOHEE AT GA 31 S PENNEKAMP STATE PARK WEEKI WACHEE SPRINGS	CHATTAHOOCHEE R A COBB CO WTR INTK ROANDKE RIVER AT LAFAYETTE, VA. ROANDKE RIVER AT ROANDKE, VA. ROANDKE RIVER AT ALTAVISTA, VA ROANDKE R AT LAFAYETTE VA	PROANDKE (STAUNTON) RIVER AT RANDOLPH, VA. MAYO CR NR BETHEL HILL N.C. DOAN RIVER NEAR FRANCISCO, N.C. HUFFINES MILL CR NR BETHANY N C	SMITH RIVER AT EDEN, N. C. DAN RIVER AT PACES VA HYCO CREEK NEAR LEASBURG N C DOUBLE CREEK NEAR ROSEVILLE N C SOUTH HYCO CREEK NEAR ROSEVILLE N C	HYCO RIVER AT MCGHEES MILL N C MAYO CREEK TRIB NEAR ALLENSVILLE N C ROANOKE RIVER AT ROANOKE RAPIDS, N.C. ROANOKE RIVER NEAR SCOTLAND NECK NC INDIAN CREEK TRIB AT SR1123 NEAR CAHABA N C	CONIDIT CREEK AT SR 1108 NR CAHABA N C 7 HARDISON CREEK NR ROBERSON STORE N C 1 NOTTOWAY RIVER NR SEBRELL VA 2 BLACKWATER R NR FRANKLIN, VA	
HYDROLOGIC Unit Code		030007 G 030007 I 030007 Z 030008 G	030008 M 030009 M 030010 C 030010 H	030011 D 03010101 03010101 03010101	03010102 03010103 03010103 03010103	03010103 03010104 03010104 03010104	03010104 03010107 03010107 03010107	03010107 03010107 03010201 03010202	

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BASIN DESCRIPTOR	014	000 44 400 004 44 400	014 004 004 024	888 8 888 8	00 00 4 4	00 00 00 4 4 4 4 4	0004
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STATE	051 037 037 051 051	037 037 037 037	037 037 037 037 037	037 037 037 037 037	037 037 037 037 037	037 037 037 037 037	037 037 037
LONGITUDE	0765355 0765600 0773227 0773235	0770136 0793621 0783500 0781743 0782024	0775551 0775440 0774034 0775516 0781905	0780005 0775234 0774200 0773200	0771113 0771330 0771330 0771343	0771443 0771443 0770109 0765226 0763101	0764449 0754019 0790614 0785424
LATITUOE	364545 362225 361124 363055	362214 363229 361141 360541 360314	355057 355310 355535 360642 362306	360959 361108 360900 355338 354630	353157 353200 353200 353347 353347	353355 353355 353403 351925 354335	354349 353818 360418 360421
STATION NAME AND LOCATION	BLACKWATER R NR FRANKLIN, VA DEEP CREEK AT N C 45 NR COFIELD N C AMDSKIE CREEK AT AHOSKIE N C MEHERRIN RIVER AT EMPORIA, VA JACKS SWAMP NR PLEASANT HILL N C	POTECASI CREEK NEAR UNION, N. C. DAN RIVER NEAR MAYFIELD N C TAR RIVER NEAR TAR RIVER N C TAR R AT US 401 AT LOUISBURG N C CEDAR CREEK NEAR LOUISBURG, N. C.	TAR RIVER NEAR NASHVILLE, N. C. SAPONY CREEK NEAR NASHVILLE, N. C. WALNUT CREEK AT SR1225 AT KINGSBORO N C SWIFT CREEK AT HILLIARDSTON, N. C. FISHING CREEK NEAR MIDDLEBURG N C	WHITE DAK SWAMP NEAR ACTON N C LITTLE FISHING CREEK NEAR WHITE DAK N C FISHING CREEK NEAR ENFIELD, N. C. TAR RIVER AT TARBORO, N. C. CONETOE CREEK NEAR BETHEL, N. C.	CHICOD CR AT SR 1565 NR GRIMESLAND N C COW SWAMP NEAR GRIMESLAND N C COW SWAMP NEAR GRIMESLAND N C CHICOD CR AT SR 1760 NEAR SIMPSON N C CHICOD CR AT SR 1760 NEAR SIMPSON N C	JUNIPER BRANCH AT SR 1766 NR SIMPSON N C JUNIPER BRANCH AT SR 1766 NR SIMPSON N C HERRING RUN NEAR WASHINGTON N C DURHAM CREEK AT EDWARD N C NORTH LAKE CANAL ABOVE PUNGO LAKE NR WENONA	VAN SWAMP NEAR HDKE N C ALBEMARLE CANAL NEAR SWINDELL N C END RIVER AT HILLSBORD, N.C. END RIVER NEAR DURHAM, N. C.
HYDROLOGIC Unit Code	030 10202 030 10203 030 10203 030 10204 030 10204	03010204 030106 E 03020101 03020101	03020101 03020101 03020101 03020101	03020102 03020102 03020102 03020103 03020103	03020103 03020103 03020103 03020103	03020103 03020103 03020104 03020104	03020104 03020104 03020201 03020201

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STATE		037 037 037 037	037 037 037 037 037	037 037 037 037	037 037 037 037	037 037 037 037	037 037 037 037	037 037 037 037	
LONGITUDE		0785424 0785244 0785124 0784920	3457 3437 3432 2411 2421	0782100 0783530 0781557 0781112 0780936	0781721 0775951 0775257 0773509 07731312	0771112 0771040 0771346 0771145	0780629 0775240 0780442 0774822	0773510 0773041 0772207 0765826	
LATITUDE		360820 361057 361036 361030	60254 60233 55627 55624 53905	353046 353412 351756 353518	354517 352014 351414 351529	352542 352507 352330 352042 350354	354129 353410 354855 352920 352400	352540 353208 350225 345756	
STATION NAME AND LOCATION		LITTLE RIVER NEAR ORANGE FACT FLAT RIVER AT BAHAMA, N. C. DIAL CREEK NEAR BAHAMA, N.C. ROCKY CREEK NEAR BAHAMA N.C	NEUSE RIVER NEAR NORTHSIDE N C HORSE CREEK TRIB AT SR 1140 NR POCOMOKE N C NEUSE RIVER AT FALLS N C NEUSE RIVER NEAR FALLS N C NEUSE RIVER TRIB ABOVE SR 1705 NEAR CLAYTON NEUSE RIVER NEAR CLAYTON, N. C.	NEUSE RIVER AT SMITHFIELD, N.C. MIDDLE CREEK NEAR CLAYTON, N. C. BEAVERDAM CREEK NEAR DOBBERSVILLE N.C. LITTLE RIVER NEAR KENLY, N.C. LITTLE RIVER NEAR PRINCETON, N.C.	BLACK RIVER NEAR TOMAHAWK N C NEUSE RIVER NEAR GOLDSBORD, N. C. MILL CREEK NEAR SEVENS SPRINGS N C NEUSE RIVER AT KINSTON, N. C. CLAYFOOT SWAMP NEAR SHELMERDINE N C	CREEPING SWAMP NEAR CALICO N C CREEPING SWAMP TRIB AT SUTTON ROAD NR WILMAR CREEPING SWAMP NEAR VANCEBORO N C SWIFT CREEK NEAR VANCEBORO N C TRENT RIVER NEAR TRENTON, N.C.	CONTENTNEA CREEK NEAR LUCAMA, N. C. TURNER SWAMP NEAR EUREKA, N. C. WHITE OAK SWAMP NEAR MOUNT PLEASANT N C NAHUNTA SWAMP NEAR SHINE, N. C. RAINBOW CREEK AT US 258 NEAR BROWNTOWN N C	CONTENTNEA CREEK AT HOOKERTON, N. C. LITTLE CONTENTNEA CREEK NEAR FARMVILLE, N. C CROOKED RUN AT SR 1123 NEAR TRENTON N C BRICE CREEK AT SR 1100 AT CROATAN N C	
HYDROLOGIC UNIT CODE			03020201 03020201 03020201 03020201 03020201	03020201 03020201 03020201 03020201	03020201 03020202 03020202 03020202	03020202 03020202 03020202 03020202	03020203 03020203 03020203 03020203	03020203 03020203 03020204 03020204	

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LONGITUDE	0795715 0793657 0794230 0792202 0793145	0791029 0791446 0790802 0790544 0790512	0790150 0790136 0790359 0795646 0795105	0793917 0793915 0793730 0791956 0792008	0790648 0790600 0785809 0785517 0784848	54 0791040 16 0784635 28 0775332 05 0784927 02 0784124	0781738 0785708 0782917 0783728	
LATITUDE	361024 361031 360713 360513 360513	355634 355634 354548 354640 354207	354708 354412 353856 360215 355406	355026 354336 352913 352305 353937	353741 353700 353418 353219 352430	351054 351546 341128 345005 344602	342415 350137 345713 352052	
STATION NAME AND LOCATION	REEDY FORK NEAR DAK RIDGE, N. C. PREEDY FORK NEAR GIBSONVILLE, N. C. NORTH BUFFALO CREEK NEAR GREENSBORO, N.C. HAW RIVER AT HAW RIVER, N.C. BIG ALAMANCE CREEK NEAR ELON COLLEGE N C	CANE CREEK NEAR BUCKHORN N C CANE CREEK NEAR TEER, N. C. HAW RIVER NEAR BYNUM N C WARD CREEK NEAR BYNUM N C HAW RIVER NEAR PITTSBORD, N.C.	NEW HOPE CR TRIB AT SR 1715 NR FARRINGTON N NEW HOPE RIVER NEAR PITTSBORO, N. C. HAW RIVER NEAR HAVWOOD, N. C. EAST FORK DEEP RIVER NEAR HIGH POINT, N.C. DEEP RIVER NEAR HIGH POINT, N.C.	SANDY CREEK TRIB AT MELANCTON N C DEEP RIVER AT RAMSEUR, N.C. GRASSY CREEK NEAR JUGTOWN N C BIG GOVERNORS CREEK TRIB NEAR CARTHAGE N C IICK CREEK NEAR MOUNT VERNON SPRINGS, N. C.	DEEP RIVER AT MONGURE, N.C. DEEP RIVER AT US HIGHWAY 1 AT MONGURE N C BUCKHORN CREEK NR CORINTH, N.C. PARKERS CREEK TRIB NEAR COKESBURY N C CAPE FEAR RIVER AT LILLINGTON, N. C.	FLAT CREEK NEAR INVERNESS N C LLITTLE RIVER AT LINDEN, N. C. HEWLETTS CR AT SR1102 NEAR WILMINGTON N.C. CAPE FEAR R AT WILM O HUSKE LOCK NR TARHEEL ELLIS CREEK TRIB AT SR1325 NEAR WHITE OAK N.	CAPE FEAR R AT LOCK # 1 NR KELLY, NC BUCKHEAD CREEK NEAR OWENS N.C. LITTLE COHARIE CREEK NEAR ROSEBORO, N. C. BLACK RIVER AT SR 1722 NEAR DUNN N.C.	
HYDROLOGIC Unit CODE	03030002 03030002 03030002 03030002	03030002 03030002 03030002 03030002	03030002 03030002 03030003 03030003	03030003 03030003 03030003 03030003	03030003 03030004 03030004 03030004	03030004 03030005 03030005 03030005	03030005 03030006 03030006	

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DRAINAGE Area	49.00 2.80 600.00 63.80 7.80	7.60 382.00 29.00 50.90 .30	93.90 493.00 122.00 854.00	80.40 121.00 231.00	42.80 1680.00 1.70 64.40 178.00	42.30 .40 2280.00 1.05 2.00	313.00 153.00 4.84	
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LONGITUDE	0783821 0782025 0774957 0780222 0775803	0774857 0813330 0812413 0811547	0811009 0810845 0810241 0805803	0804836 0805006 0804020 0803343	0802553 0802639 0803459 0801818	0801807 0801432 0802310 0802624 0805516	0803938 0804445 0810400 0803904	
LATITUDE	351703 344215 344945 344432 344402	343027 344845 355929 360416 360304	361029 360909 361459 361027	361858 362815 362027 362416 362149	361756 360755 361113 360216 36001	360022 355730 355124 355117 355915	355039 360001 355200 354402	
STATION NAME AND LOCATION	BLACK RIVER NEAR DUNN N C SOUTH RIVER TRIB AT N C 41 AT TOMAHAWK N C NORTHEAST CAPE FEAR RIVER NEAR CHINQUAPIN, N ROCKFISH CREEK NEAR WALLACE, N. C. LITTLE ROCKFISH CREEK AT WALLACE N C	LILLINGTON CREEK NEAR ST HELENA N C SOUTH RIVER NEAR PARKERSBURG, N. C. YADKIN RIVER AT PATTERSON, N. C. ELK CREEK AT ELKVILLE, N.C. BIG WARRIOR CREEK SUBTRIB NEAR BOOMER N C	REDDIES RIVER AT NORTH WILKESBORO, N. C. YADKIN RIVER AT WILKESBORO N C ROARING RIVER NEAR ROARING RIVER, N. C. GRAYS CREEK NEAR CLINGMAN N C YADKIN RIVER AT ELKIN, N. C.	MITCHELL RIVER NEAR STATE ROAD, N. C. ENDICOTT CREEK NEAR BLEVINS STORE N C FISHER RIVER NEAR COPELAND, N. C. ARARAT RIVER AT ARARAT, N. C. EAST PRONG LITTLE YADKIN R TRIB NEAR CAPELLA	LITTLE YADKIN RIVER AT DALTON, N. C. YADKIN RIVER AT ENON, N. C. LITTLE FORBUSH CREEK NEAR FORBUSH N C SALEM CREEK NR ATWOOD, N. C MUDDY CREEK NEAR MUDDY CREEK, N. C.	SOUTH FORK MUDDY CREEK NR. CLEMMONS, N.C. FRYES CREEK TRIB AT SR 1506 NEAR MIDWAY N C YADKIN RIVER AT YADKIN COLLEGE N C HUMPY CREEK NEAR FORK N C OLIN CREEK AT SR 1868 NEAR UNION GROVE N C	SOUTH YADKIN RIVER NEAR MOCKSVILLE N C HUNTING CREEK NEAR HARMONY, N. C. THIRD CREEK NR. STONY POINT, N. C. TRIB TO THIRD CREEK TRIB NR BARBER, N.C.	
HYDROLOGIC Unit Code	03030006 03030006 03030007 03030007	03030007 030306 0 03040101 03040101	03040101 03040101 03040101 03040101	03040101 03040101 03040101 03040101	03040101 03040101 03040101 03040101	03040101 03040101 03040101 03040101	03040102 03040102 03040102	

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DRAINAGE AREA	6.90 2.60 3.80 105.00	55.70 8.75 3.98 5.83	1370.00 6.98 72.40 6870.00	8830.00 1030.00 178.00 1220.00 96.00	1252.00 706.00 6.40 171.00 67.20	31.80 28.20 2.60 16.10 3.20	80.00 25.40 68.40 31.40	
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LONGITUDE	0795953 0800313 0800723 0794956	0804258 0802009 0802011 0802849 0802624	0801000 0804913 0804523 0795211 0793802	0793255 0794515 0792939 0785738 0801818	0795010 0783256 0781825 0820200 0815327	0813159 0811357 0811352 0805435 0813628	0812403 0813402 0811552 0911103	
LATITUDE	352522 353210 345723 35311 351642	352953 352002 350602 345039	350900 350827 345706 345646 350126	341215 340305 350338 342632 340902	333940 340543 340607 354226	355420 355650 355324 351942 353907	354106 353526 352520 351923	
STATION NAME AND LOCATION	SPENCER CREEK AT S.R. 1303 AT UWHARRIE N.C. KILLIAN CREEK AT SR. 1349 NEAR DENVER N.C. GOULDS FORK AT SR.1205 NEAR WADESBORD I LITLE RIVER NEAR STAR, N.C.	PARK CREEK AT SR 1614 NEAR BIG BEAR CREEK NEAR RICHFI GOURDVINE CREEK AT SR 1715 LANE CREEK AT SR 2115 NEAR WICKER BRANCH AT SR 1940 N	ROCKY RIVER NEAR NORWOOD, N. C. MCMULLEN CR AT SHARON VIEW RD NEAR CHARLOTTE TWELVE MILE CREEK NEAR WAXHAW, N. C. PEE DEE R NR ROCKINGHAM, NC BONES FORK CREEK NEAR HOFFMAN N C	PEE DEE RIVER AT PEEDEE S. C. LYNCHES RIVER AT EFFINGHAM S. C. DROWNING CREEK NEAR HOFFMAN, N. C. LUMBER RIVER AT BOARDMAN, N. C. SCAPE ORE SWAMP NEAR BISHOPVILLE,SC	BLACK RIVER AT KINGSTREE, S.C. WACCAMAW RIVER AT FREELAND, N. C. JUNIPER CREEK AT N.C. 211 NEAR PROSPECT N.C. CATAWBA RIVER NEAR MARION, N.C. LINVILLE RIVER NEAR NEBO N.C.	LOWER CREEK AT MULBERRY ST AT LENDIR, N. C. LOWER LITTLE RIVER NEAR ALL HEALING SPRINGS. LOWER LITTLE R TRIB AT SR 1124 NR TAYLORSVIL LONG CREEK NEAR PAW CREEK, N. C. HENRY FORK TRIB AT SR 1924 NR PLEASANT GROVE	HENRY FORK NEAR HENRY RIVER, N.C. JACOB FORK AT RAMSEY, N. C. INDIAN CREEK NEAR LABORATORY N.C. LONG CREEK NEAR BESSEMET CITY, N. C.	
HYDROLOGIC Unit Code	03040103 03040103 03040104 03040104	03040105 03040105 03040105 03040105	03040105 03040105 03040105 03040201	03040201 03040202 03040203 03040203	03040205 03040206 03040207 03050101	03050101 03050101 03050101 03050101	03050102 03050102 03050102 03050102	

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LONGITUDE	0805420	0804606 0805212 0805409 0820642	0821210 0814557 0814152 0814056	0813545 0813720 0810300 0803732 0800950	0800925 0795947 0795120 0800825 0802330	0810755 0831802 0831822 0824920 0824536	0823542 0824446 0824832 0824728 0824856	0824626 0825142 0823831 0823735
LATITUDE	51150	50813 50813 50359 50021	835 408 229 935	352234 351500 335935 334500 332700	332715 332618 332405 332315 330140	325010 345405 344850 342125 341128	340121 341520 341904 341928 342113	342213 340842 340412 340724
STATION NAME AND LOCATION	IRWIN CREEK NEAR CHARLOTTE, N	MCALPINE SUGAR OR AL ARCHDALE KU MCALPINE CREELDW MCMULLEN OR N SUGAR CREEK NEAR FORT MILL S C COVE CREEK NEAR LAKE LURE, N.C.	SILVER CREEK NEAR MILL SPRING N C SECOND BROAD RIVER AT CLIFFSIDE, N.C. BROAD RIVER NEAR BOILING SPRINGS, N.C. FIRST BROAD RIVER NEAR CASAR, N. C.	LITTLE HARRIS CREEK AT SR 1821 NEAR CAMPBELL SUGAR BRANCH NEAR BOILING SPRINGS N C CONGAREE RIVER AT COLUMBIA, SC SANTEE RIVER NEAR FORT MOTTE S C LAKE MARION NEAR PINEVILLE, S.C.	SANTEE RIVER NR. PINEVILLE S. C. CRAWL CREEK NR PINEVILLE, S.C. SANTEE RIVER BELOW ST. STEPHENS, SC. LAKES M-M DIV CANAL NR PINEVILLE S. C. EDISTO RIVER NR GIVHANS S.C.	COOSAWHATCHIE RIVER NR HAMPTON S.C. TUCKALUGE CR1 CHATTOOGA RIVER NEAR CLAYTON, GA. HARTWELL RE DISCHARGE GA COLDWATER CREEK NR RUCKERSVILLE	SAVANNAH R AT TROTTERS SHOALS SAVANNAH RIVER NR IVA CEDAR CREEK AT HIGHWAY 181 SAVANNAH RIVER AT HIGHWAY 181 SAVANNAH R BELOW HARTWELL DAM	BIG GENEROSTEE C AT S C HWY 187 BEAVER DAM C NR ELBERTON SAVANNAH R AT CALHOUN FALLS ROCKY R NR CALHOUN FALLS
HYDROLOGIC Unit Code	03050103	03050103 03050103 03050103 03050105	03050105 03050105 03050105	03050105 03050100 03050110 03050111	03050112 03050112 03050112 03050201	03050208 03060102 03060102 03060103	03060103 03060103 03060103 03060103	03060103 03060103 03060103 03060103

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LONGITUDE	0823748 0823638 0824343 0831323	0824440 0813700 0815750 0813905 0810845	0810922 0811545 0812458 0832522 0831622	0825341 0841444 0840053 0835454	0834325 0833714 0814941 0815018 0813620	0821039 0815203 0820317 0814114	8888	
LATITUDE	341245 341525 340540 342935 335827	3323640 332305 330705 325600 320858	320955 323130 321129 335648 333452	323240 332934 332948 333652 333824	330559 325019 313916 313400 312537	320442 311316 312704 304416 302610	302131 302901 303648 291005	
STATION NAME AND LOCATION	ROCKY R NR LOWNDESVILLE ROCKY R BELOW LAKE SECESSION BEAVER DAM CREEK NEAR MIDDLETON TOMS CREEK TRIB (NFBR SWS NO. 14) NR AVALON, BROAD RIVER NEAR BELL, GA.	LITTLE RIVER NEAR WASHINGTON, GA. UPPER THREE RUNS NEAR NEW ELLENTON, BRIER CREEK NEAR WAYNESBORD, GA. BRIER CREEK AT MILLHAVEN, GA. SAVANNAH R AT R MILE 20 GA	SAVANNAH R AT R MILE 21.6 GA SAVANNAH RIVER NEAR CLYO, GA OGEECHEE RIVER NEAR EDEN, GA. MIDDLE OCONEE RIVER NEAR ATHENS, GA. OCONEE RIVER NEAR GREENSBORO, GA.	OCONEE RIVER AT DUBLIN, GA. PATES CREEK AT BUSTER LEWIS RD NEAR FLIPPEN, SOUTH RIVER NEAR MCDONDUGH, GA. YELLOW RIVER NEAR COVINGTON, GA. ALCOVY RIVER ABOVE COVINGTON, GA.	FALLING CREEK NEAR JULIETTE, GA. OCMULGEE RIVER AT MACON, GA. ALTAMAHA RIVER AT DOCTORTOWN, GA. PENHOLOWAY CREEK AT U.S. 341 NR JESUP,GA. ALTAMAHA RIVER AT EVERETT CITY, GA.	OHOOPEE RIVER NEAR REIDSVILLE, GA. SATILLA RIVER AT ATKINSON, GA. LITTLE SATILLA RIVER NEAR OFFERMAN, GA. ST MARYS R AT GA LINE US 17 MIDDLE PRONG ST MARYS RI AT TAYLOR FL	ST MARYS RIVER NR MACCLENNY, FLA. Dunns creek nr Oceanway, Florida Amelia River at Buoy 20 St Johns P. Astor-Fla Hwy 40	
HYDROLOGIC Unit Code	03060103 03060103 03060103 03060104 03060104	03060105 03060106 03060108 03060108	03060109 03060109 03060202 03070101	03070102 03070103 03070103 03070103	03070103 03070108 03070106 03070106	03070107 03070201 03070202 03070204	03070204 03070204 03070205 03090101	

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DRAINAGE AREA	297.00	248.00 968.00 25.70 1331.00 241.00	2043.00 126.00 3066.00			68.00 14.70	165.00 182.00 221.00 184.00	
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LONGITUDE	08 11922 0804550 08 11012 08 12350	0805318 0804508 0805440 0805222 0810651	08 10208 08 1292 1 08 12258 0805601	0805230 0814802 0812248 0812246 0812208	0812215 0812215 0813205 0813448 0815305	0815406 0814718 0814043 0814425 0814526	0814921 0815153 0815222 0814106	
LATITUDE	285013 280957 283917 284111 273826	280427 280504 281246 282210 284040	284250 285237 290029 282025 282110	282117 283542 283749 283811 283822	283824 283824 285449 285738 290453	292222 292910 284020 282651 282739	283533 283656 284439 284320	
STATION NAME AND LOCATION	ST JOHNS R US 17-92 ST JOHNS R FR L WASHINGTON BIG ECONLOCKHATCHEE R SR #419 LIT WEKIVA RI AT SR #434 ST. JOHNS HEADWATERS NEAR VERO BEACH; FLA.	JANE GREEN CREEK NEAR DEER PARK, FLA. ST. JOHNS RIVER NEAR MELBOURNE FLA WOLF CREEK NEAR DEER PARK, FLA. ST. JOHNS RIVER NR COCOA, FLA. ECONLOCKHATCHEE RIVER NR. CHULUOTA, FLA.	ST. JOHNS RIVER ABOVE LAKE HARNEY, FLA. BLACKWATER CREEK NR CASSIA, FLA. ST. JOHNS RIVER NR DELAND, FLA. 10B TAYLOR CREEK BL S-164 NR COCOA FLA 09E TAYLOR CREEK AT HWY 532 NR COCOA FLA	OGE TAYLOR CREEK AT LAKE POINSETT NR COCOA PALATLAKAHA R BLW LK WILSON NR CLERMON LAKE CHARITY HOLDING POND AT MAITLAND FLA OGE RUNDFF TO LK CHARITY AT MAITLAND FLA. OGE RUNDFF TO LK FAITH AT MAITLAND FLA.	RUNDFF TO LK HOPE AT MAITLAND, FLA RAINFALL AT LAKE HOPE AT MAITLAND, FLA BLACK WATER CR AT LK NORRIS RD NR CASS BLACK WATER CREEK AT SR42 NR ALTOONA OKLAWAHA R AT SR 464	OKLAWAHA RIVER AT SR 316 OKLAWAHA R. DWNSTRM OF RODMAN DA LK APOPKO BEAUCLAIR CA BRF NT RANG BIG CREEK NR CLERMONT, FLA. LITTLE CREEK NR CLERMONT, FLA.	PALATLAKAHA R AT CHERRY LK OUT NR GROVELAND, PALATLAKAHA RIVER NR MASCOTTE, FLA. PALATLAKAHA R AT STRUCT M-1, NR OKAHUMPKA, F APOPKA-BEAUCLAIR CANAL NR ASTATULA, FLA.	
HYDROLOGIC Unit Code	03080101 03080101 03080101 03080101	03080101 03080101 03080101 03080101	03080101 03080101 03080101 03080101	03080101 03080101 03080101 03080101	03080101 03080101 03080101 03080101	03080102 03080102 03080102 03080102	03080102 03080102 03080102 03080102	

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DRA INAGE AREA	879.00 1018.00 1196.00 1367.00	54.30 2747.00 2762.00	7094.00	3.51 6.27 25.80	19.80 33.40		89.20 1607.00 2899.00
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LATITUDE	290455 291100 291250 293220	293228 293030 292900 283009 283113	294454 293240 293245 293848 301119	301935 302730 301407 301527 301948	302425 295050 290301 282407 275127	273854 272812 273115 281605 273137	281814 274814 271332 271333 271233
STATION NAME AND LOCATION	OKLAWAHA R AT MOSS BLUFF, FLA. OKLAWAHA RIVER NR OCALA, FLA. OKLAWAHA RIVER NR CONNER, FLA. OKLAWAHA RIVER AT EUREKA, FLA. ORANGE CREEK AT ORANGE SPRINGS, FLA.	DEEP CREEK NR RODMAN, FLA. OKLAWAHA R AT RODMAN DAM NR ORANGE SPRINGS. OKLAWAHA R AT ST HWY 19, NR SALT SPRINGS. FL PALATLAKAHA R AT LK LOUISA O NR CLERMO	ST JNS R US HWY 17 CITY OF PALATKA CROSS FL BARGE CA AB BUCKMAN LOCK NR PALATKA CROSS FL BARGE CA AT BUCKMAN LOCK NR PALATKA ST. JOHNS RIVER AT PALATKA, FLA. JULINGTON CREEK NR GREENLAND, FLA.	MCCOY CREEK AT JACKSONVILLE, FLA. CEDAR CREEK NR PANAMA PARK, FLA. PABLO CREEK AT JACKSONVILLE, FLA. POTTSBURG CREEK NR BOWDEN, FLORIDA MCGIRTS CREEK NR WHITEHOUSE, FLORIDA	TROUT RIVER NR DINSMORE, FLORIDA MOULTRIE CREEK AT SHWY 207 NR ST AUGUSTINE, SPRUCE CREEK NR SAMSULA, FLA. BENNETT CAUSEWAY RT 528 INDIAN R CONFLUENCE SEBASTIAN R IND R	MAIN CANAL AT VERO BEACH, FLA. BELCHER CANAL AT JOHNSON ROAD CANAL AT JUNCTION OF 603 AND INDRIO ROAD SHINGLE CR AT US HWY 17-92 BR DO ARBUCKLE CR AT ARBUCKLE CR RD	SHINGLE CREEK AT AIRPORT NR KISSIMMEE, FLA. KISSIMMEE RIVER BL S-65 NR LAKE WALES, FL KISSIMMEE R AT S-65E NR OKEECHOBEE, FLA. KISSIMMEE R AT S-65E NR OKEECHOBEE FLA.
HYDROLOGIC Unit Code	03080102 03080102 03080102 03080102 03080102	03080102 03080102 03080102 03080102	03080103 03080103 03080103 03080103	03080103 03080103 03080103 03080103	03080103 03080201 03080201 03080202	03080203 03080203 03080203 03090101 03090101	03090101 03090101 03090101 03030101

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MISAB Rotairora	124 014	00 4 4 0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 4	013	0 4 4 4 4 4	0 4 4 4 4 4 4 4 4	0 4 4 4 4 4	014 014	
DRAINAGE AREA	15.70 98.70 311.00			146.00			83.00	
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LONGITUDE	0804756 0805344 0804920 0811854	0810025 0805221 0801715 0800904 0802529	0804334 0801700 0802033 0801543	0801706 0801030 0800332 0802645	0801758 0801750 0800728 0800757	0801142 0802735 0802510 0802629	0801348 0801348 0802630 0801651	
LATITUDE	271235 272339 271703 265556	270535 270853 270630 254905 255627	254542 252820 272016 271755 271541	270639 265620 263840 262820 262345	262120 261345 261351 261220 261022	260805 261348 261650 260843 260640	260539 260539 260340 260351	
STATION NAME AND LOCATION	TAYLOR CREEK US-441 S TAYLOR CREEK NR BASINGER, FL TAYLOR CREEK AB OKEECHOBEE, FLA. FISHEATING CREEK S OF PALMDALE FISHEATING CREEK AT PALMDALE, FLA.	INDIAN PRAIRIE CANAL AT S-72 NR OKEECHOBEE. 10B KISSIMMEE RIVER AT LAKE OKEECHOBEE FLA ST LUCIE LOCK STRUCTURE ON ST LU BISCAYNE BAY MIAMI CA BRIDGE FL HWY 27	TAMIAMI C WTR CONTR STRUCT S-12C BISCAYNE BAY NAVY MARKER 2 RIM DITCH @ S-49 SL108 THE SAVANNAHS AT WALTON F RIM DITCH NEAR WALTON FLA	ST LUCIE CA AT LOCK NR STUART FLA LDXAHATCHEE RIVER NEAR JUPITER WEST PALM BEACH CANAL AT WEST PALM BEACH FLA HILLSBORD CANAL AT S-6 NEAR SHAWAND 10B EVERGLADES STA 1-15 NR DELRAY BEACH FL	10B HILLSBORD CANAL AT S-39 NR DEERFIELD BCH CYPRESS C CA AT S38 NR POMPANO B POMPANO CA AT POMPANO BEACH FLA CYPRESS CREEK C AT S-374, NR POMPANO BEACH, MIDDLE RIVER C AT S-36 NR FT LAUDERDALE FLA	PLANTATION ROAD C AT S-33 NR FT. LAUDERDALE N NEW RIVER CA BL S-11C NR FT. LAUDERDALE EVERGLADES STA 2-17 NR ANDYTOWN FLA N NEW R CA AT 20 MI BEND 10B N NEW R CA AB HOL LAT NR FT LAUD FLA	NDRTH RIVER CANAL NEAR FT LAUDERDALE FLA NORTH RIVER CANAL NEAR FT LAUDERDALE FLA SOUTH NEW RIVER CANAL AT S-9 NEAR DAVIE 108 SO NEW R CA AB S-13A NR DAVIE FLA	
HYDROLOGIC Unit CODE	03090102 03090102 03090103 03090103	03090103 03090103 03090202 03090202	03090202 03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202	

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MISAB ROTAIRD230	014	014	014	014	0 4 4 4 4 4 4 4 4 4 4	00000 4 4 4 4 4	0 1 4 4 1 0 0 1 4 4 1 0 0 1 4 1 0 0 1 4 1 0 0 1 4 1 0 0 1 1 1 1	
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COUNTY	011 011 011	025 025 025 025 025 025	021 021 025 025 025	025 025 025 025 025	025 025 025 011 011	0000	9999	
3TAT2	210 210 210	2 2 2 2 2 2	012 012 012 012	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	012 012 012 012	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	012 012 012	
LONGITUDE	0801232 0800919 0800819	0802550 0804620 0802252 0801715 0811530	0811530 0805850 0804318 0801948	0801952 0802055 0802051 0803131	0803950 0804845 0801545 0801453 0800843	0801108 0800858 0800947 0801031	0801328 0801402 0801412 0801328	
LATITUDE	260357 250313 255750	255600 261945 255331 254938 254829 255310	255310 255105 254855 254543 254011	253234 252920 252813 251914 254542	254620 255600 255741 260031	260514 260702 260717 260743 260807	260807 260807 260807 260808	
STATION NAME AND LOCATION	SOUTH NEW RIVER CANAL AT S-13 NR DAVIE, FLA HOLLYWOOD CANAL AT DANIA SNAKE CREEK CAT N.W. 67TH AVE NR HIALEAH, F BISCANNE CANAL AT S-28 ND MIAMI FLA	LITTLE RIVER CANAL AT 527 AT MIAMI, FLA MIAMI CA AT S8 NR LK HARBOR FLA PENSUCO CAN AT PENSUCO FL MIAMI CA AT WATER PLT HIALEAH FLA MIAMI CANAL AT N.W. 36TH STREET, MIAMI, FLA TAMIAMI CANAL OUTLETS, MONROE TO CARNESTOWN,	TAMIAMI CANAL DUTLETS, MONROE TO CARNESTOWN, TAMIAMI CANAL DUTLETS, 40-MILE BEND TO MONRO EVERGLADES 3-65S NEAR MIAMI, FLA. TAMIAMI CANAL NR. CORAL GABLES, FLA SNAPPER CREEK C AT S-22, NR, SOUTH MIAMI, FL		L-67A O.5 MI. N OF TAMIAMI CA NR MIAMI, FLA 10B L-28 EAST CA NR PINECREST FLA SNAKECREEKCANAL NEAR HIALEAH FLA DAVIE ROAD CANAL AT PEMBROKE PINES FLA 10B DANIA CUTOFF CA W OF FECRR BR AT DANIA	N NEW RIV CA AT SW 31 AVE FT LAUDERDALE NEW RIVER AT SW 4TH & 7TH AVE FT LAUDERDALE 108 N FORK NEW R BRWD BLVD AT FT LAUDERDAL 108 N FORK NEW RIVER AT FT LAUDERDALE FLA 108 PLAT CA AT HWY 441 IN PLANTATION	108 PLAT CA AT SUNRISE BLVD NR LAUD HILL PLANTATION CA & NW 65TH AVE PLANTATION, FLA PLANTATION CA AT NW 65TH AVE AT PLANTATION F PLANTATION CA AT NW 47 AVE BRIDGE PLANTATION	
HYDROLOGIC Unit Code	03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202	

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DRAINAGE AREA							1367.00 229.00 107.00	
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3TAT2	012 012 012	99999	012 012 012 012	012 012 012 012	012 012 012 012	0 1 2 1 2 1 0 0 1 2 1 0 0 1 2 1 0 1 0 1	0 0 0 0 1 0 1 0	
LONGITUDE	0803810 0801723 0805330	0800935 0800935 0800716 0801217 0801249	0803205 0802300 0802100 0802713	0802626 0800830 0805850 0812100	0813524 0813638 0810518 0811811	0814155 0815235 0814742 0815918 0815117	0815234 0821850 0821850 0820704	
LATITUDE	260850 260919 260945	26 1240 26 1348 26 1349 26 1938 26 1938	262000 262400 264100 271911 271927	272321 262030 255105 255800 261147	261335 264248 265023 264722 264248	264325 271319 273840 271158 265756	271319 271425 271425 274747	
STATION NAME AND LOCATION	10B MIAMI CA AT ALLIGATOR ALLEY MIDDLE RIVER CANAL NR LAUDERHILL FLA OB L-28 INTERCEPTOR BL STR4 AT ANDYTOWN F	10B MIDDLE RIVER CANAL AT LAUDERFILL FLAT 10B CA-13 FEEDER CA AT 10TH AVE FT LAUDERD 10B L-28 BORROW CA AB S-140 NR ANDYTOWN FL 10B POMPANO CA AT SR 7 AT MARGATE FLA HILLSBORD CANAL AT US 441 AT DEERFIELD L-3 CANAL 7 MI WEST OF S-8 NR ANDYTOWN	10B NDRTH NEW RIVER CANAL AB S7 NR ANDYTOW 10B HILLSBORD CA AB SIO NR ANDYTOWN FLAW PALM BEACH CANAL E OF S-5A(E) NR LOXAHATCH C-24 AT SR 709 NR FT PIERCE FLAN FK ST LUCIE R NR PRIMA VISTA BLVD NR FT PI	35S39E33 SL41 JCT 10MI CR-TRIB 6MI SW FT PIE HILLSBORD C CONT STRUC W DEERFIE TAMIAMI CANAL DUTLETS, 40-MILE BEND TO MONRO BARRON RIVER NR EVERGLADES, FLA.	10B GDLDEN GATE TRIB CA NR NAPLES FLA CALODS R SR 78B BR CALODSAHATCHEE R MODRE HAVEN LOC CALODSAHATCHEE CANAL AT ORTONA LOCK NR LA BE CALODSAHATCHEE RIVER AT ALVA FLA	CALOOSAHATCHEE RIVER AT S-79, NR. OLGA, FLA PEACE RIVER BR FLA HWY #70 PEACE RIVER BR FLA HWY #664 HOR CK SR 72 BR SHELL CR 6 MI E OF SR 764	PEACE RIVER AT ARCADIA, FLA. MYAKKA RIVER NR SARASOTA, FLA. MYAKKA RIVER NR SARASOTA, FLA. SOUTH PRONG ALAFIA RIVER NR LITHIA, FLA.	
HYDROLOGIC Unit Code	03090202 03090202 03090202	03090202 03090202 03090202 03090202 03090202	03090202 03090202 03090202 03090202	03090202 03090204 03090204 03090204	03090204 03090205 03090205 03090205	03090205 03100101 03100101 03100101	03100101 03100102 03100102 03100204	

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BASIN Descriptor				014	124	900		
DRAINAGE AREA	335.00 220.00 60.00		130.00	1825.00 2020.00 2020.00	350.00	805.00 1260.00 50.00	2430.00	
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LONGITUDE	0821241 0821241 0821357 0821357 0821357	0822736 0823606 0823433 0823150 0824245	0824431 0824437 0823826 0820944 0814908	0822059 0822059 0822653 0823701	0823642 0823700 0823820 0831918 0834809	0835508 0824534 0823338 0824402 0824140	0824418 0824800 0824725 0824724	
LATITUDE	275219 281117 280859 280859	275121 275442 273643 274111 274624	274914 274932 290116 283312 282138	285919 285919 290257 290035 290035	290131 290130 290115 294711 302202	301352 301940 304050 303240 302920	301932 302214 302430 302505	
STATION NAME AND LOCATION	ALAFIA RIVER AT LITHIA, FLA. HILLSBORDO R OLD CRYSTAL SPRING R HILLSBORDUGH RIVER NR ZEPHYRHILLS, FLA. HILLSBORDUGH RIVER NR ZEPHYRHILLS, FLA. FLINT CREEK NR THONOTOSASSA, FLA.	HILLSBORD BAY 3/4 MI E MACDILL AFB OLD TAMPA BAY CRT OF HWD FRNKLN BR BISHOPS HARBOR ENTRANCE COCKROACH BAY ENTRANCE BEAR CREEK AT 58TH ST N AT ST PETERSBURG, FL	10J JOES CREEK @ 54TH AVE N AT ST PETE FLA 10J JOES C AT SCB POL PLANT AT ST PETE FLA WITHLACOOCHEE R, DOWN INGLIS RES WITHLACOOCHEE R HWY 575 BR WITHLACOOCHEE RIVER NR EVA, FLA.	WITHLACOOCHEE RIVER NR HOLDER, FLA. WITHLACOOCHEE RIVER NR HOLDER, FLA. BLUE RUN AT DUNNELLON, FLA. WITHLACOOCHEE R AT INGLIS DAM NR DUNNELLON, WITHLACOOCHEE R BL INGLIS DAM NR DUNNELLON,	BARGE CANAL ABOVE INGLIS LOCK NR INGLIS, FLA BARGE CANAL AT INGLIS LOCK NR INGLIS, FLA. WITHLACODCHEE R BYPASS CH BEL STR NR INGLIS, STEINHATCHEE RIVER NEAR CROSS CITY, FLA. AUCILLA R AT US 19-27	AUCILLA RIVER NR SCANLON, FLA. SUWANNEE RIVER & US 41 & SR 136 SUWANNEE RIVER AT FARGO, GA. ROCKY CREEK NR BELMONT, FLA. HUNTER CREEK NEAR BELMONT FLA	SUWANNEE RIVER AT WHITE SPRINGS, FLA. SWIFT CREEK AT FACIL FLA OCCIDENTAL SAMPLING SITE #6 OCCIDENTAL SAMPLING SITE #4	
HYDROLOGIC Unit Code	03100204 03100204 03100205 03100205	03100206 03100206 03100206 03100206	03100207 03100207 03100208 03100208	03100208 03100208 03100208 03100208	03100208 03100208 03110102 03110103	03110103 03110201 03110201 03110201	03110201 03110201 03110201 03110201	

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OW END RA3Y	1976 1976 1976	197	197,	197	195 197 197	197 197 197	197	•
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BASIN BOT91R3230		000 4 4		00 4 4	014	8000	£003	
DRAINAGE AREA		663.00 1400.00 208.00 7880.00	575.00 535.00 102.00	150.00 315.00 153.00	72.00 1450.00 .32	36.00 3.10 86.80 2.60	34.79	
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COUNTY	047 047 047 047	019 101 075 029 121	001 129 129 129 073	063 137 137 137 187	135 121 121 067 089	097 121 121 121	089 121 149 285	
3TAT2	012 012 012 012		012 012 012 012	012 013 013 013	013 013 013 013	013 013 013 013	013 013 013	
LONGITUDE	0824709 0824803 0824630 0824630	0831133 0830200 0833032 0825724 0825540	0822535 0840900 0840900 0842940 0842303	0845142 0833809 0833204 0833714 0835623	084 1005 084 16 10 084 27 16 084 27 27 084 1757	0842015 0842216 0842404 0842428 0842428	0842015 0842528 0850600 0851050	
LATITUDE	302512 302548 302743 302744	303 214 515 112	295518 301600 301600 300745	304232 343437 343649 343227 343141	340144 340302 335133 334940 335053	334955 334707 334811 334910 334918	335414 335135 331645 325235	
STATION NAME AND LOCATION	OCCIDENTAL SAMPLING SITE #7 OCCIDENTAL SAMPLING SITE #5 OCCIDENTAL #27 SPILLWAY OCCIDENTAL \$PILLWAY #22 HINTED CDEEK MINE		SANTA FE RIVER AT WORTHINGTON SPRINGS, FLA. ST. MARKS RIVER NEAR NEWPORT, FLA. ST. MARKS RIVER NEAR NEWPORT, FLA. SOPCHOPPY RIVER NR SOPCHOPPY, FLA. OCHLOCKONEE RIVER NR HAVANA, FLA.	UIM WOODRUF D WATER INTUSPHS STA CHATTAHOOCHEE RIVER NEAR LEAF, GA. SOOUE RIVER AT ST RT 17 AT CLARKSVILLE, GA. CHATTAHOOCHEE RIVER NEAR CORNELIA, GA. CHESTATEE RIVER AT ST RT 52 NEAR DAHLONEGA.	CHATTAHDOCHEE RIVER AT ST RT 120 NR DULUTH, BIG CREEK NEAR ALPHARETTA, GA. CHATTAHDOCHEE RIVER AT ATLANTA, GA. CHATTAHOOCHEE R TRB (COBB CO WPC) ATLANTA, G N FK P'TREE C TRB (MEADOWCLF D) NR CHAMBLEE.	N.F. P'TREE CR AT BUFORD HWY NR ATLANTA, GA. CLEAR CREEK AT PIEDMONT PARK AT ATLANTA, GA. TANYARD BRANCH AT 26TH ST EXT AT ATLANTA, GA PEACHTREE CREEK AT ATLANTA, GA. WOODALL CR AT DEFOORS FERRY ROAD AT ATLANTA.	NANCY CR TR (W NANCY CR DR) NR CHAMBLEE, GA. NANCY CREEK AT RANDALL MILL ROAD AT ATLANTA, CHATT R FRANKLIN GA CHATT R WEST POINT HWY 29 GA	
HYDROLOGIC Unit Code	03110201 03110201 03110201 03110201	03110202 03110202 03110202 03110205 03110205	03110206 03120001 03120001 03120003	03120004 03130001 03130001 03130001	03130001 03130001 03130001 03130001	03130001 03130001 03130001 03130001	03130001 03130001 03130002	

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BASIN DESCRIPTOR			900	014 014 124 014	004	0004	004	000	
DRAINAGE AREA	. 85 . 60	17.00	246.00	2060.00 37.00 2430.00	342.00 272.00 101.00 1850.00	2900.00 197.00 5310.00 188.00	620.00 485.00 17200.00	781.00	
TYPE OF	A A S	A A A A	N A A A	MS AN S	MS SW SW SW SW	AS SA SA SA SA SA SA SA SA SA SA SA SA SA S	AS SW SW SW SW	N W W W W W W W W W W W W W W W W W W W	
COUNTY	121	067 067 067	121 121 097 121	121 045 045 017 145	053 061 255 077 293	193 193 307 095 007	007 087 045 063 013	013 045 005 005	
3TAT2	013 013	013 013 013	0000	013 013 001 013	013 013 013 013	013 013 013 013	013 013 012 012	20022	
LONGITUDE	084 084	0843301 0843158 0843218	0843720 0843346 0843653 0843807	0844025 0845542 0845404 0851104 0850922	0844912 0850300 0842545 0843125 0841357	0840300 0840238 0843253 0840839	0843252 0844418 0850200 0845133 0850951	0850955 0850200 0851841 0853324	
LATITUDE	334744 334739	335345 335028 334627 334427	334401 334435 334622 334036	333924 333146 332837 325148 325102	322448 313600 331439 331910 324317	321800 321753 320313 313539 313317	312258 310223 294935 304203 303200	303202 294100 294630 302304	
STATION NAME AND LOCATION	PROCTOR C TRB (HOLLYWOOD RD WPC) AT ATLANTA. PROCTOR CREEK AT ST RT 280 AT ATLANTA, GA.	NICKAJACK CR (USAF PLANT 6 DUTFALL) SMYRNA, NICKAJACK CR AT COOPER LAKE DR NR MABLETON, CHATTAHOOCHEE R TRB NO.4 (S COBB WPC) ATL, G CHATTAHOOCHER R TRR NO.6 (UIDY WPC) NR ATL	NORTH FORK UTOY CR AT BEECHER RD AT ATLANTA, UTOY CREEK AT ST RT 70 NEAR ATLANTA, GA. SWEETWATER CREEK NEAR AUSTELL, GA. CHATTAHOOCHEE R TRB NO.5 (CMP C WPC) NR ATL,	CHATTAHOOCHEE RIVER NEAR FAIRBURN, GA. SNAKE CREEK NEAR WHITESBURG, GA. CHATTAHOOCHEE RIVER NEAR WHITESBURG, GA. CHATTAHOOCHEE RIVER (LANETT INT) AT LANETT. CHATT R AB LONG CANE CR JCT NR WEST POINT, G	UPATOI CREEK NEAR COLUMBUS, GA. CHATT R FT GAINES GA FLINT RIVER NEAR GRIFFIN, GA. LINE CREEK NEAR SENDIA, GA. FLINT RIVER NEAR COLLODEN GA	FLINT R AT MONTEZUMA GA FLINT RIVER AT MONTEZUMA, GA. KINCHAFOONEE CREEK AT PRESTON, GA. FLINT RIVER AT ALBANY, GA.	ICHAWAYNOCHAWAY CREEK AT MILFORD, GA. SPRING CREEK NEAR IRON CITY, GA. APALACHICOLA R BUDY 40 MILE 11A APALACHICOLA RIVER AT CHATTAHOOCHEE FLA CHIPOLA R HWY 274 SW OF ALTHA	CHIPOLA RIVER NR ALTHA, FLA. APALA BAY SEC C ST JOE BAY 3 MI S OF CITY RAMP ECONFINA CREEK NEAR BENNETT, FLA.	
HYDROLOGIC UNIT CODE	03130002	03130002 03130002 03130002	03 130002 03 130002 03 130002 03 130002	03130002 03130002 03130002 03130002 03130002	03130003 03130004 03130005 03130005	03130006 03130006 03130007 03130008	03130009 03130010 03130011 03130011	03130012 03130014 03140101 03140101	

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OW END AA3Y	1975		1968		1974	197		
OM BEGIN	1959 1969 1958 1970 1970	1968 1958 1970 1973 1966	1955 1968 1952 1973 1960	1941 1963 1941 1941 1960	1961 1961 1961 1961	1961 1962 1962 1961 1951	1962 1971 1971 1972	
MISAB ROTGIRDS30			900	004 014	400	014	014	
DRAINAGE AREA	624.00	394.00	3817.00	682.00 238.00 856.00 34.50	605.00	15100.00	22000.00	
TYPE OF STIE	E E S S S S S S S S S S S S S S S S S S	SE S	N N N N N	N N N N N N N N N N N N N N N N N N N	M M M M M M M M M M M M M M M M M M M	N N N N N N N N N N N N N N N N N N N	3 3 3 3 0 0 0 0	
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3TAT2	012 012 012 012	012 012 012 012	012 012 013 013	013 013 013 013	013 013 013 013	88888	001 028 028 028	
LONGITUDE	0863745 0864400 0865820 0870830	0872409 0872625 0872200 0860000	0871403 0871142 0871400 0850155	0845542 0844125 0843031 0845137 0850916	0844430 0845900 0844610 0845000 0842947	0862432 0862430 0865413 0872400 0873045	0873045 0882500 0882642 0882350	
LATITUDE	 304510 305002 304230 302200	303610 304125 302530 302530	305754 303251 305725 344110 344300	344000 343615 344018 343435 343404	340950 341300 340913 340800	322442 322441 323458 320700 313248	313248 342600 341555 341220	
STATION NAME AND LOCATION	YELLOW RIVER AT MILLIGAN, FLA. BLACKWATER RI AT HWY 4 NW BAKER BIG COLDWATER CREEK NR MILTON, FLA. ESCAMBIA BAY SEC C BACKGR STA E BAY SEC C BACKGR STA	PERDIDO R HWY 184 BR MUSGOGEE PERDIDO RIVER AT BARRINEAU PARK, FLA. PERDIDO BAY SEC C BACKGROUND STA CHOCTAWHATCHEE A PINEY PT FLASH LI CHOCTAWHATCHEE RIVER NR BRUCE, FLA.	ESCAMBIA RIVER HWY 4 BRIDGE ESCAMBIA RI AT HWY 90 BR ESCAMBIA RIVER NEAR CENTURY, FLA. STOVER CR 2 CONTROL HOLLY CREEK NEAR CHATSWORTH, GA.	CODASAUGA RIVER AT TILTON, GA. COOSAWATTEE R CARTERS GA COOSAWATTEE RIVER NEAR ELLIJAY, GA. COOSAWATTEE RIVER NEAR PINE CHAPEL, GA. WEST ARMUCHEE CREEK NEAR SUBLIGNA, GA.	ETOWAH R BL ALLATOONA DAM GA ETOWAH R KINGSTON GA ETOWAH R CARTERSVILLE HWY 41 GA ETOWAH R CARTERSVILLE HWY 61 GA ETOWAH RIVER AT CANTON, GA.	ALABAMA R MONTGOMERY AL ALABAMA RIVER NEAR MONTGOMERY AL MULBERRY CREEK AT JONES AL ALA R NR MILLERS FERRY ALA R AT CLAIBORNE	ALABAMA RIVER AT CLAIBORNE AL TOMBIGBEE R NR MARIETTA MS TOMBIGBEE R NR FULTON MS TOMBIGBEE R AT BEANS FERRY MS	
HYDROLOGIC Unit Code	03140103 03140104 03140104 03140105	03140106 03140106 03140107 03140203	03140305 03140305 03140305 03150101	03150101 03150102 03150102 03150102	03150104 03150104 03150104 03150104	03150201 03150201 03150201 03150203	03150204 03160101 03160101	

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MOITA SIMABRO	USCE USCE USCE USCE USCE	USCE USCE USGS USGS USGS	USGS USGS USGS USCE USCE	USGS USCE USCE USCE USCE	USGE USGE USCE USCE USCE	USCE USCE USCE USCE USCE	USCE USCE USCE USCE	
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DRAINAGE AREA		66.80	612.00 1924.00 4451.00	230.00	787.00			
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YTNUDO	057 057 095 095	057 087 141 141	057 095 087 095 095	081 075 095 095 095	095 095 017 017	025 025 025 025 025	025 087 087 087	
3TAT2	028 028 028 028	028 028 028 028 028	028 028 028 028	028 001 028 028 028	028 028 028 028 028	028 028 028 028 028	028 028 028 028	
LONGITUDE	0882326 0882550 0883050 0883107 0883107	0882353 0882900 0881732 0881600 0881922	0882642 0883303 0882740 0883740	0884143 0880747 0881354 0881717 0882724	0882545 0881855 0885300 0884735	0884355 0885555 0885115 0884555	0884905 0883745 0881855 0882342	
LATITUDE	340518 340540 340040 333914	340735 333300 344142 343953 343134	341553 335907 332940 340332 335910	341408 335508 335339 335258 333948	334024 334724 340005 335310 335030	334747 335030 334705 334030 333625	333526 332850 333355 333050	
STATION NAME AND LOCATION	BULL MOUNTAIN C NR SMITHVILLE MS TOMBIGBEE R AT BARRS FERRY MS TOMBIGBEE R AT BIGBEE MS TOMBIGBEE R AT ABERDEEN MS TOMBIGBEE R AT COLUMBUS MS	TOMBIGBEE R AT IRONWOOD BLUFF MS TOMBIGBEE R AB COLUMBUS MS BURGESS CREEK NR PADEN, MS. BLACK BRANCH AT PADEN, MS. MACKEYS CREEK NR DENNIS, MS.	TOMBIGBEE RIVER NR FULTON, MS. TOMBIGBEE RIVER NR AMORY, MS. TOMBIGBEE RIVER NR COLUMBUS, MS. TOWN C NR NETTLETON MS TOMBIGBEE R NR AMORY MS	TOWN CREEK AT EASON BOULEVARD AT TUPELO, MIS BUTTAHATCHEE RV NR SULLIGENT AL BUTTAHATCHEE RV NR GATTMAN MS BUTTAHATCHEE RV NR GREENWOOD MS BUTTAHATCHEE RV NR GREENWOOD MS	BUTTAHATCHEE R AT HAMILTON MS BUTTAHATCHEE RIVER NEAR ABERDEEN, MISS. CHUQUATONCHEE CR NR OKALONA MS CHUQUATONCHEE CR E BUENA VISTA MS CHUQUATONCHEE CR NR EGYPT MS	CHUQUATONCHEE CR NR PRAIRIE MS HOULKA CR W TREBLOC MS HOULKA CR NR MCCONDY MS HOULKA CR N ABBOTT MS CHUQUATONCHEE CR NR WEST POINT MS	LINE CR NR CEDAR BLUFF MS CATALPA CR NR MAYHEW MS LUXAPALLILA C AT STEENS MS LUXAPALLILA CR NR COLUMBUS WW MS	
HYDROLOGIC Unit Code	03160101 03160101 03160101 03160101	03160101 03160101 03160101 03160101	03160101 03160101 03160101 03160102	03160102 03160103 03160103 03160103	03160103 03160103 03160104 03160104	03160104 03160104 03160104 03160104	03160104 03160104 03160105 03160105	

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OW END AA3Y	1975	1975 1975 1980	1980	1975	1979		1977 1977	1977 1977 1977	
DW BEGIN	1964	1971 1973 1978	1978 1961 1973 1963	1973 1966 1966 1963	1962 1978 1965 1962 1967	1967 1967 1963 1962	1965 1965 1962 1975	1975 1975 1975 1975	
MIZAB Rotqirəzəd	8		900	00 4 4	014	888	888		
DRAINAGE AREA	309.00	7230.00	7230.00 8700.00 753.00 55.60	812.00 1140.00 24.00	13.00 26.00 188.00 213.00	4.70 115.00 134.00 3.30	85.00 90.10 80.90 .50	.35 11.60 2.41	
TYPF OF SITE	A S	AS AS	A S S A S A S S A	MS A	MS AN SW	A S A S A S A S A S A S A S A S A S A S	MS MS	N N N N N N N N N N N N N N N N N N N	
COUNTY	107	119 087 063	063 119 063 093 057	119 103 119 043	043 043 127 127	127 127 127 127	127 133 073 073 073	073 073 073 073	
3TAT2	02 8	001 028 001	88888	00 00 00 00 00 00 00	88888	88888	88888	8888	
LONGITUDE	980	0880900 0882355 0880916	0880915 0880924 0880651 0874047 0873727	088 1745 088 1057 088 3340 088 1745 0865 137	0870014 0865839 0871837 0871525 0870941	0873314 0872659 0872302 0872130	0872315 0872356 0864845 0864936	0864956 0865159 0865154 0865200	
LATITUDE	333335	324900 332034 325108	325108 324930 330212 335547 334125	325506 324936 330608 325506	335710 335340 335635 335430 335305	335405 335329 334856 334550 334417	334020 341707 334425 334521 334532	334534 334341 334343 334345	
STATION NAME AND LOCATION	LUXAPALLILA CREEK AT STEENS, MISS. TOMBIGBEE R NR COCHRANE AL	TOMBIGBEE R AT GAINESVILLE AL TOMBIGBEE RIVER BL COLUMBUS, MISS TOMBIGBEE R AT GAINESVILLE L&D NR GAINESVILL	TOMBIGBEE R BL GAINESVILLE L&D NR GAINESVILL TOMBIGBEE RIVER AT GAINESVILLE AL SIPSEY R NR PLEASANT RIDGE NEW RIVER NEAR WINFIELD AL ELLIS CREEK NEAR BERRY AL	NOXUBEE R NR GEIGER AL NOXLBEE R AT GAINESVILLE AL NOXUBEE RIVER AT MACON, MISS. NOXUBEE RIVER NEAR GEIGER AL MARRIOTT CREEK NEAR GARDEN CITY AL	DORSEY CREEK NEAR ARKADELPHIA AL DORSEY CREEK BELOW ARKADELPHIA AL TRIBUTARY TO SPRING CREEK NEAR MANCHESTER AL BLACKWATER CREEK NEAR MANCHESTER AL BLACKWATER CREEK NEAR JASPER AL	TRINITY CREEK NEAR CARBON HILL AL CHEATHAM CREEK NEAR CARBON HILL AL LOST CREEK NEAR JASPER AL LOST CREEK NEAR OAKMAN AL BLACK BRANCH NEAR OAKMAN AL	WOLF CREEK NEAR OAKMAN AL SIPSEY FORK NEAR GRAYSON AL TURKEY CREEK AT MORRIS AL TRIB TO TURKEY CREEK DOWNSTREAM FROM MORRIS TURKEY CREEK UPSTEAM FROM KIMBERLY AL	TRIBUTARY TO TURKEY CREEK NEAR KIMBERLY AL CROOKED CREEK NEAR MT OLIVE AL TRIBUTARY TO CROOKED CREEK NEAR MT OLIVE AL CROOKED CREEK DOWNSTREAM FROM MT. OLIVE, AL	
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STATION NAME AND LOCATION	1 CROOKED CREEK NEAR MORRIS AL 1 FIVEMILE CREEK AT CARDIFF AL 2 ROCK CREEK NEAR HOPKINS AL 2 MUD CREEK NEAR OAK GROVE AL 2 UNNAMED TRIB TO WALKER COUNTY SHOAL CREEK AL	TRIB TO UNNAMED TRIB TO WALKER CO SHOAL CREE LITTLE YELLOW CREEK NEAR WHITSON AL BLUE CREEK NEAR DAKMAN AL BLUE CREEK NEAR WINDHAM SPRINGS AL BLUE CREEK NEAR SPENCER HILL AL	HANNAH MILL CREEK NEAR BURCHFIELD AL CANE CREEK NEAR BURCHFIELD AL TRIBUTARY TO ROCKY BRANCH NEAR PETERSON AL TRIBUTARY TO YELLOW CREEK NR WINDHAM SPRINGS YELLOW CREEK ABOVE NORTHPORT AL	TRIBUTARY TO YELLOW CREEK NEAR NORTHPORT AL YELLOW CREEK NEAR NORTHPORT AL TRIB TO YELLOW CK AB WATERMELON RD NR TUSCAL CYPRESS CREEK NEAR HOLT AL HURRICANE CREEK NEAR CEDAR COVE AL	HURRICANE CREEK NEAR HOLT AL UNNAMED TRIB TO CANE CREEK NEAR PEA RIDGE AL ELLIS CREEK NEAR CLEVELAND AL LITTLE TYRO CREEK NEAR SANDTOWN AL TYRO CREEK NEAR NEW LEXINGTON AL	DRY BRANCH NEAR SAMANTHA AL BEAR CREEK NEAR SAMANTHA AL NORTH RIVER NEAR SAMANTHA AL JOHNSON BRANCH NEAR UTLEY AL CRIPPLE CREEK NEAR SAMANTHA AL	CRIPPLE CREEK EAST OF SAMANTHA AL TRIBUTARY TO TURKEY CREEK NEAR TUSCALOOSA AL TURKEY CREEK NEAR TUSCALOOSA AL BARBEE CREEK NEAR NEW LEXINGTON AL	
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STATION NAME AND LOCATION		BARBEE CREEK NEAR SAMANTHA AL BLACK WARRIOR RIVER BL WARRIDR DAM NR EUTAW BLACK WARRIOR RIVER AT WARRIOR DAM NR EUTAW BLACK WARRIOR R BL WARRIOR L&D NR SAWYERVILL TOMBIGBEE R JACKSON AL	TOMBIGBEE R BL COFFEEVILLE L&D NR COFFEEVILL OKATIBBEE CREK NR MERIDIAN, MS. SOWASHEE CR AT MERIDIAN, MISS OKATIBBEE CREEK AT ARUNDEL, MS. CHICKASAWHAY RIVER AT ENTERPRISE, MS.	CHICKASAWHAY RIVER AT WOOD CHICKASAWHAY RIVER NR WAYN BUCKATUNNA CREEK NEAR DENHCHICKASAWHAY RIVER AT LEAK LEAK RIVER NR COLLINS, MS.	LEAF RIVER NEAR ELLISVILLE, MISS. LEAF RIVER AT EASTABUCHIE, MS. BOWIE CREEK NR HATTIESBURG, MS. OKATOMA C AT SANFORD MS BOWIE RIVER NR GLENDALE, MS.	LEAF RIVER NR PALMER, MS. TALLAHALA CREEK AT WALDRUP, MS. TALLAHALA CREEK NR SANDERSVILLE, MS. TALLAHALA CREEK NR RUNNELSTOWN, MS.	LEAF RIVER NR MC LAIN, MS. PASCAGOULA RIVER NR BENNDALE, MS. PASCAGOULA RIVER AT HWY 90 AT PASCAGOULA, MI WEST PASCAGOULA RIVER AT HWY 90 AT GAUTIER, BLACK CREEK NR BROOKLYN, MS.	CYPRESS CREEK NR JANICE, MS. ESCATAWPA RIVER NEAR AGRICOLA MS ESCATAWPA RIVER AT MOSS POINT, MS. MISS SND BL ST LOUIS B,IWW MI 55	•
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STATION NAME AND LOCATION	TCHOUTALABOUFFA R NR BILOXI MISS TUXACHANIE C NR BILOXI MISS BILOXI R NR LYMAN MISS BACK BAY OF BILOXI NEAR BILOXI, MISS. BACK BAY OF BILOXI AT OCEAN SPRINGS, MISS.	WOLF RIVER NR LANDON, MS. ST. LOUIS BAY AT HWY 90 AT BAY ST. LOUIS, MI PEARL RIVER NEAR CARTHAGE, MISS. PEARL RIVER AT BARNETT RE NEAR JACKSON, MISS PEARL R AB BYRAM MS	PEARL RIVER AT BYRAM, MS. PEARL R NR GEORGETOWN MS PEARL RIVER NEAR MONTICELLO, MISS. RIGOLETS O.5 MI W OFLIT RIGOLETS PEARL RIVER NEAR COLUMBIA, MISS.	PEARL RIVER NR BOGALUSA HOBOLDCHITTD CREEK NR PICAYUNE, MS. MCGEES C AT TYLERTOWN MISS BOGUE CHITTO NR LEHR MS BOGUE CHITTO NEAR BUSH, LOUISIANA	
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STATION NAME AND LOCATION	GREAT L	ST JOSEPH R AT ST JOSEPH MI GRAND R AT GRAND HAVEN, MI AUSABLE R. CSCOCA MI HURON R BL ROCKWOOD MI ST CLAIR R AT PORT HURON MI	RIVER RAISIN AT MONROE MI MENOMINEE RIVER NEAR PEMBINE, WI MENOMINEE R AT MARINETTE PESHTIGO R AT PESHTIGO THUNDER BAY AT ALPENA MI	SHEBOYGAN R AT SHEBOYGAN, WI MENOMONEE R AT F NR MENOW FALL WI MENOMONEE R AT R CT AT MEN FALL WI W DENVER STM SEW AT 91 AT MILWAUKE MARTHA WASH DRAIN AT WAUWATOSA WI	N FISH C NR ASHLAND WI NORTH FISH C NR INO WI BOIS BRULE R NR CLOVERLAND WI AMNICON R WEIR WI POKEGAMA R NR S SUPERIOR WI	POKEGAMA R NR DEWEY WI SAWBILL L T62N,R4W 20 MI N TOFTE POPLAR R.9MI.E TOFTE MINN KIMBALL CK TRIB.10 MI.NE GD.MAR. UNNAMED CK 10 MI.NE GRAND MARAIS	KADUNCE CK TRIB. 10 MI.NE GND.MAR KADUNCE CK TRIB. 10 MI.NE GND.MAR BAPTISM RIVER NEAR BEAVER BAY, MN EAST BRANCH BEAVER RIVER <	LITTLE THIRTYNINE CREEK < WEST BRANCH BEAVER RIVER < BEAVER RIVER < BEAVER RIVER <	
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STATION NAME AND LOCATION	BEAVER RIVER < SPLIT ROCK RIVER < ST LOUIS RIVER7MISE AURORA MINN ST. LOUIS RIVER AT SCANLON, MN NEMADJI RIVER NEAR DEDHAM, WI	NEMADJI RIVER NEAR BOYLSTON, WI BLACK RIVER NR. BOYLSTON, WIS. CLOQUET R.22MI.N.TWO HARBORS ELIM CREEK NEAR HOLYOKE, MN	SKUNK CREEK BELOW ELIM CREEK NEAR HOLYOKE, M SKUNK CREEK BELOW ELIM CREEK NR HOLYOKE, MN DEER CREEK NEAR HOLYOKE, MN NEMADJI RIVER NEAR DEWEY, WI LITTLE BALSAM CREEK AT PATZAU, WI	LITTLE BALSAM CREEK NEAR PATZAU, WI LITTLE BALSAM CREEK TRIBUTARY NEAR PATZAU, W LITTLE BALSAM CREEK NEAR FOXBORO, WI BALSAM CREEK NR. PATZAU, WIS. NEMADJI RIVER NEAR SOUTH SUPERIOR, WI	PEARSON CREEK NEAR MAPLE, WI BOIS BRULE RIVER AT BRULE, WI BOIS BRULE RIVER NEAR LAKE SUPERIOR, WI MIDDLE CREEK NEAR IRON RIVER, WI MIDDLE CREEK AT HATCHERY NEAR IRON RIVER, WI	MIDDLE CREEK AT TOWN ROAD NEAR IRON RIVER, W SCHACTE CREEK SPRING NEAR IRON RIVER, WI SCHACTE CREEK NEAR IRON RIVER, WI SCHACTE CREEK AT TOWN ROAD NEAR IRON RIVER. SIOUX RIVER NEAR WASHBURN, WI	PINE CREEK AT MOQUAH, WI PINE CREEK TRIBUTARY AT MOQUAH, WI PINE CREEK NEAR MOQUAH, WI BAD RIVER NEAR MELLEN, WI	
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STATION NAME AND LOCATION	ALDER CREEK NEAR UPSON, WI BAD RIVER NEAR ODANAH, WI WHITE RIVER AT RESERVOIR NR SANBORN, WIS.	BAD RIVER AT ODANAH, WI PAULDING#2CG T46N R39W S15 ONTONAGON R NR ROCKLAND, MICH STURGEON R NEAR CHASSELL, MI TAHQUAMENON RIVER NR TAHQUAMENON PARADISE, M	KODONCE CREEK 8 MI.E G MARAIS WASHINGTON CREEK AT WINDIGO, MICH. ST MARYS RIVER ABOVE SAULT STE MARIE, MICH. BRANCH RIVER NEAR BRANCH, WI PIGEON R AT EVERGREEN PK AT SHEBOYGAN,WI	SHEBOYGAN RIVER AT SHEBOYGAN, WI MILWAUKEE RIVER TRIBUTARY NEAR FREDONIA, WI KOHLSVILLE R E KEWAUNEE RIVER NEAR KEWAUNEE, WI KEWAUNEE RIVER NEAR KEWAUNEE, WI	KEWAUNEE RIVER NR KEWAUNEE, WIS. EAST TWIN RIVER AT MISHICOT, WI MANITOWOC RIVER AT MANITOWOC, WI NB OCONTO R NR CARTER WI OCONTO RIVER NEAR GILLETT, WI	SB PESHTIGO R NR ARGONNE WI NB PESHTIGO R NR ARGONNE WI OTTER C NR ARGONNE WI PESHTIGO R NR BLACKWELL WI RAT RIVER NR WABENO WI	OTTER C NR CARTER WI ELVOY C NR NELMA WI ALLEN C BL CONFLUENCE GASPARDO C BRULE RIVER NEAR FLORENCE, WI	
HYDROLOGIC Unit Code	04010302 04010302 04010302	04010302 04020102 04020102 04020104	04020300 04020300 04020300 04030101	04030101 04030101 04030101 04030102	04030102 04030102 04030102 04030104	04030105 04030105 04030105 04030105	04030105 04030106 04030106	

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LATITUDE	454549 455016 453556 463325	454955 455600 455226 455534 454748	454530 454440 452946 451920 453042	454520 462957 462800 462822 462648	462508 462340 462222 462440	461710 455431 435352 434109 435714	452952 452918 452846 452844
STATION NAME AND LOCATION	POPPLE RIVER NEAR FENCE, WI PINE R BELOW PINE R POWERPLANT NEAR FLORENCE MENOMINEE RIVER NEAR PEMBINE, WI PESHEKEE RIVER NEAR CHAMPION, MICH. MICHIGAMME RIVER NEAR WITCH LAKE, MICH.	PINE RIVER AT PINE RIVER CAMPGROUNDS, WIS. NB PINE R AB DAM NR ALVIN WI PINE R NR LONG LK WI STEVENS C NR TIPLER WI POPPLE R AT POPPLE R WI	POPPLE RIVER NR. FENCE, WIS. S. BR. POPPLE RIVER NR. FENCE, WIS. PIKE RIVER AT AMBERG, WI MENOMINEE RIVER NEAR MCALLISTER, WI GLISKE CREEK NEAR MOLE LAKE, WI	FORD RIVER NR HYDE, MICH. MIDDLE BRANCH ESCANABA RIVER AT HUMBOLT, MIC LAKE LORY OUTLET NR HUMBOLDT, MICH. MCKINNON LAKE OUTLET NR HUMBOLDT, MICH. LAKE LORY OUTLET NE REPUBLIC, MICH.	BLACK RIVER NR REPUBLIC, MICH. M BR ESCANABA RIVER NR ISHPEMING, MICH. GREEN CREEK NR PALMER, MICH. ELY CREEK NR NATIONAL MINE, MICH. SCHWEITZER CREEK NEAR PALMER, MICH.	EAST BRANCH ESCANABA RIVER AT GWINN, MICH ESCANABA RIVER AT CORNELL, MICH LAWRENCE CREEK NEAR WESTFIELD, WI GRAND RIVER NEAR KINGSTON, WI FOX RIVER AT BERLIN, WI	SWAMP CREEK NEAR CRANDON, WI SWAMP CREEK ABOVE RICE LAKE, AT MOLE LAKE, W SWAMP CREEK BELOW RICE LAKE, AT MOLE LAKE, W SWAMP C NR MOLE LK WI
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STATION NAME AND LOCATION		EMBARRASS RIVER NEAR EMBARRASS, WI EMBARRASS R NR EMBARRASS WI WOLF RIVER AT NEW LONDON, WI LITTLE WOLF RIVER NEAR GALLOWAY, WI LITTLE WOLF RIVER AT ROYALTON, WI FIMMORROW RIVER AT AMHERST, WIS.	α IZU	DAK CREEK AT SOUTH MILWAUKEE, WI ROOT RIVER NEAR FRANKLIN, WI ROOT RIVER NEAR FRANKLIN, WI ROOT RIVER CANAL NEAR FRANKLIN, WI ROOT RIVER AT RACINE, WI	ROOT RIVER AT RACINE, WI PIKE RIVER NEAR RACINE, WI GRAND R. AT CO. HWY. H, NR. KINGSTON, WIS. MILWAUKEE RIVER AT KEWASKUM, WI MILWAUKEE R AT KEWASKUM WI	EAST BRANCH MILWAUKEE RIVER NEAR NEW FANE, WE B MILWAUKEE R AT NEW FANE WIN. BR. MILWAUKEE RIVER NR. CASCADE, WIS. NORTH BRANCH MILWAUKEE RIVER NEAR FILLMORE, N B MILWAUKEE R NR FILLMORE WI	MILWAUKEE RIVER AT WAUBEKA, WI CEDAR CREEK NEAR CEDARBURG, WI MILWAUKEE RIVER AT MILWAUKEE, WI MENDMONEE RIVER AT GERMANTOWN, WI	
HYDROLOGIC Unit Code	04030202 04030202 04030202		04030202 04030204 04040001 04040001	04040002 04040002 04040002 04040002	04040002 04040003 04040003 04040003	04040003 04040003 04040003 04040003	04040003 04040003 04040003 04040003	

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LATITUDE	431254 431132 441020 431030	30827 30728 30317 30238 30244	430302 430234 430135 425530 450249	415435 415317 415418 415423 415348	415401 415426 415458 415545 415604	415631 415631 415638 415627 415704	415744 415902 415808 415808	
STATION NAME AND LOCATION	JEFFERSON PARK DRAIN AT GERMANTOWN, WI MENOMONEE RIVER AT MENOMONEE FALLS, WI MENOMONEE RIVER AT MENOMONEE FALLS, WI MENOMONEE RIVER AT BUTLER, WI	NOVES CREEK AT MILWAUKEE, WI LITTLE MENOMONEE RIVER AT MILWAUKEE, WI UNDERWOOD CREEK AT WAUWATOSA, WI HONEY CREEK AT WAUWATOSA, WI MENOMONEE RIVER AT WAUWATOSA, WI	SCHOONMAKER CREEK AT WAUWATOSA, WI HAWLEY ROAD STORM SEWER AT WAUWATOSA, WI MENOMONEE RIVER AT FALK CORP AT MILWAUKEE, W OAK CREEK AT SOUTH MILWAUKEE, WI PESHTIGO RIVER AT PESHTIGO, WI	ST JOSEPH R AT CONSTANTINE RD BRDG BAW BEESE LAKE INLET AT M-99 NR HILLSDALE. M BAW BEESE LK OUT AT LKVW RD AT HILLSDALE, MI BAW BEESE LK OUT AT GRSWLD RD AT HILLSDALE. KING LK INLET AT CAMBRIA RD AT HILLSDALE.	KING LAKE OUTLET AT M-99 AT HILLSDALE, MICH. KING LK OUT AT STEAMBURG RD AT HILLSDALE, MI ST. JOSEPH RIVER AT SOUTH ST AT HILLSDALE, M ST. JOSEPH R AT FAYETTE ST AT HILLSDALE, MIC ST. JOSEPH R AT FAYETTE ST AT HILLSDALE, MIC	WINDNA LK OUT AT HILLSDALE ST AT HILLSDALE, BEEBE CREEK AT MAUCK RD NEAR NORTH ADAMS, MI BEEBE CREEK AT KNOWLES RD NR NORTH ADAMS, MI BEEBE CREEK AT STATE RD NEAR NORTH ADAMS, MI BEEBE C AT LK PLEASANT RD NR NORTH ADAMS, MI	BEEBE CREEK AT MILNES RD NEAR HILLSDALE, MIC BEEBE C TRIB AT BARKER RD NR NORTH ADAMS, MI BEEBE C TRIB AT MILNES RD NEAR HILLSDALE, MI UNNAMED TRIB TO BEEBE CR TRIB NR N. ADAMS, M	
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LATITUDE	415802 415838 415759 415715	415858 415937 415858 420054 420158	420237 415558 415521 415747 415851	415908 420145 420304 420421 420032	420238 420407 420420 420604 420751	413804 412854 413536 414945 424621	424803 420850 420934 421211	
STATION NAME AND LOCATION	TR TO BEEBE C TR AT MILNES RD NR HILLSDALE. HALF MOON LK OUT,N ADAMS RD,NR JONESVILLE. M BEEBE CREEK TRIB AT BALL RD NR HILLSDALE, MI BEEBE CREEK NEAR HILLSDALE, MICH. ST JOSEPH RIVER AT MOORE RD NR HILLSDALE. MI	ST JOSEPH RIVER AT US-12 AT JONESVILLE, MICH ST. JOSEPH R BELDW STP AT JONESVILLE, MICH. BUTTERNUT CREEK NEAR JONESVILLE, MICH. ST. JOSEPH R AT STERLING RD NR LITCHFIELD, M ST. JOSEPH R AT MILL POND AT LITCHFIELD, MIC	ST. JOSEPH RIVER AT LITCHFIELD, MICH. SAND C TRIB BELOW MECHANIC RD NR HILLSDALE. SAND CREEK AT SAND LAKE RD NR JONESVILLE. MI SAND CREEK AT US-12 NEAR ALLEN, MICH. SAND C TRIBUTARY AT BEULOW RD NEAR ALLEN, MI	SAND CREEK AT JONESVILLE RD NR ALLEN, MICH. SAND CREEK AT LITCHFIELD, MICH. SAND CREEK AT STORMS RD NEAR LITCHFIELD, MIC ST. JOSEPH R AT S CO LINE RD NR LITCHFIELD, SOAP CREEK AT MCLAINE RD NEAR LITCHFIELD,	SOAP CREEK AT LITCHFIELD RD NR LITCHFIELD. M SOAP CREEK AT ELY RD NEAR LITCHFIELD, MICH. SOAP CREEK AT S CO LINE RD NR LITCHFIELD. MI ST. JOSEPH R AT T DRIVE SOUTH NEAR HOMER. MI ST JOSEPH RIVER AT CLARENDON, MICH.	PIGEON CREEK NR ANGOLA, IND. NB ELKHART RIVER AT COSPERVILLE. IND. ELKHART RIVER AT GOSHEN, IND. ST. JOSEPH RIVER AT NILES, MICH. BLACK R AT HOLLAND MI	BLACK R AT R AVE BRDG AT HOLLAND SOUTH BRANCH KALAMAZOO RIVER AT HOMER, MICH. SOUTH BRANCH KALAMAZOO RIVER BELOW HOMER, MI SOUTH BRANCH KALAMAZOO RIVER NEAR ALBION, MI	
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LONGITUDE	0844455 0844141 0861153 0841853 0843257	0842855 0840451 0840201 0842840	0845445 0845518 0843238 0844156 0844206	0861432 0850413 0855721 0851405 0852910	0862732 0861636 0861648 0862523 0861728	0860542 0861846 0862629 0862339 0861225	0852651 0845320 0862004 0861209	
LATITUDE	421425 421406 423850 424224 424318	423824 423937 423808 424340 424502	425120 430002 425604 425552 425634	430332 425820 430053 423658 425709	435708 440606 435640 43230 431007	431254 432532 434653 434548 431600	433807 442006 431344 431547	
STATION NAME AND LOCATION	SOUTH BRANCH KALAMAZOO RIVER AT ALBION, MICH NORTH BRANCH KALAMAZOO RIVER NEAR ALBION, MI KALAMAZOO RIVER AT SAUGATUCK, MICH. RED CEDAR R AT ZIMMER RD BRDG RED CEDAR R AT ELM ST BRDG IN LANS	SYCSMORE C AT HOLT RD BRDG M B RED CEDAR R AT OLD US 16 BRDG RED CEDAR R AT BOWEN RD BRDG RED CEDAR RIVER AT EAST LANSING, MICH GRAND RIVER AT LANSING, MICH	GRAND RIVER AT PORTLAND, MICH MAPLE R AT M-21 BRDG LAKE ADAMS OUT AT DEWEY RD NR NORTH ADAMS, M S SAND LK OUTLET AT BACON RD NR HILLSDALE, M M SAND LK OUT AT MECHANIC RD NR HILLSDALE, M	GRAND R AT THE MOUTH GRAND RIVER AT IONIA, MICH. GRAND RIVER AT EASTMANVILLE, MICH. THORNAPPLE R AT MCKEOWN RD HASTING THORNAPPLE R GRAND R DR BRDG NR AD	PERE MASQUETTE R AT LUDINGTON MI BIG SABLE R AT QUARTERLINE RD BRDG PERE MARQUETTE R AT SCOTTVILLE RD WHITE R NR WHITEHALL MI BLACK C NR MOUTH	BLACK CR AT EVANSTON RD BRIDGE WHITE R AT NORTHBOUND US31 PENTWATER R AT PENTWATER MI N BR PENTWATER R AT US 31 BRDG MUSKEGON RIVER AT US-31 NR MUSKEGON, MICH.	MUSKEGON R BL BIG RAPIDS MUSKEGON R AT M55 BRDG MUSKEGON R AT S BANK OF DUTLET MUSKEGON R AT NORTHBOUND US31	
HYDROLOGIC UNIT CODE	04050003 04050003 04050004 04050004	04050004 04050004 04050004 04050004	04050004 04050005 04050005 04050005	04050006 04050006 04050006 04050007	04060101 04060101 04060101 04060101	04060101 04060101 04060101 04060101	04060102 04060102 04060102 04060102	

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3TAT2	026 026 026 026	026 026 026 026 026	026 026 026 026 026	026 026 026 026 026	026 026 026 026 026	026 026 026 026 026	026 026 055 026	
LONGITUDE	0860902 0854830 0860211 0861924	0854600 0854100 0853500 0854100	0854234 0854540 0855347 0861909 0861435	0861454 0842821 0842852 0832616 0840840	0832616 0844540 0832603 0832030 0843738	0832628 0835048 0834113 0840112	0835351 0832727 0875712 0831430	
LATITUDE	431606 432500 441454	41100 40700 40400 40646 40705	441016 441045 441247 441502 455818	455706 453843 453802 450416 445209	450415 444642 442610 442626 443955	442609 440205 440254 440421 435906	433406 434403 444908 435622	
STATION NAME AND LDCATION	MOSQUITD CR, END OF MILL IRON RD MUSKEGON R AT BRDG ST BRDG NEWAGGO MUSKEGON R NR BRIDGETON, MICH. MANISTEE R AT MAPLE STREET BRDG	PINE R 2MI.SW HOXEYVILLE, MICH. PINE R 6MI N.LUTHER.MICH. PINE R 3MI.S BRISTOL,MICH. PINE RIVER NEAR LUTHER, MICH. SILVER CREEK NEAR LUTHER, MICH.	POPLAR CREEK NEAR HOXEVVILLE, MICH. PINE RIVER NEAR DUBLIN, MICH. PINE RIVER NEAR WELLSTON, MICH. MANISTEE R AT MANISTEE, MICH. MANISTIQUE RIVER ABOVE MANISTIQUE, MICH.	MANISTIQUE RIVER AT MANISTIQUE, MICH CHEBOYGAN R AT US-23 BRIDGE CHEBOYGAN R AT LINCOLN AVE AT CHEBOYGAN, MIC THUNDER BAY R- DAM ABOVE 9TH ST HUNT CREEK NEAR LEWISTON, MICH.	THUNDER BAY RIVER AT ALPENA, MI AUSABLE R AT CO RD 612 BRDG W FRED AU SABLE R AT REA RD BRIDGE VAN ETTEN CR. AT M-171 BRIDGE AU SABLE R AT KEYSTONE LNDG NR GRAYLING, MIC	AU SABLE R NEAR AU SABLE, MI RIFLE R AT STATE ROAD AU GRES R. AT US-23 BRIDGE RIFLE RIVER NEAR STERLING, MICH. PINE R NR STANDISH MI	KAWRAWLIN R AT KAWRAWLIN MI SEBEWAING R AT SEBEWAING MI PENSAUKEE RIVER NEAR PENSAUKEE, WI PIGEON R NEAR CASEVILLE, MI	
HYDROLOGIC UNIT CODE	04060102 04060102 04060102 04060103	04060103 04060103 04060103 04060103	04060103 04060103 04060103 04060103	04060200 04070004 04070006 04070006	04070006 04070007 04070007 04070007	04070007 04080101 04080101 04080101	04080102 04080103 04080103 04080103	

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LATITUBE		4340147 433452 434757 432058	33801 24822 23537 31303 30304	424856 424925 430054 431517 430049	430302 430703 430404 430626 431028	430456 431408 430220 431830	432702 431940 433605 432446 440837	441534 442427 441550 425919	
STATION NAME AND LOCATION		MILLUW K AI US 29 BKDG TITTABAWASSEE R MAPLETON TITTABAWASSEE R CURTIS RD EDENVILL PINE R AT HARRISON RD BRDG DINE D BI CT I DITS	CHIPPEWA R SHIAWASSEE SHIAWASSEE SHIAWASSEE	SHIAWASSEE RIVER AT LINDEN, MICH. SHIAWASSEE RIVER AT BYRON, MICH. SHIAWASSEE RIVER AT DWOSSO, MICH. SHIAWASSEE RIVER NEAR FERGUS, MICH.	FLINT R AT ELMS RD BRIDGE FLINT R AT MOUNT MORRIS RD FLINT R AT CARPENTER RD BRDG FLINT R AT GENESEE RD BRDG FLINT R AT KLAN RD BRDG	S B FLINT R AT MAYFIELD RD BRDG FLINT R AT E BURT RD BRIDGE FLINT RIVER NEAR FLINT, MICH. FLINT RIVER NEAR FOSTERS, MICH.	CAS R AT WELLS RD BRDG WAHJAMEGA CASS RIVER AT FRANKENMUTH, MICH. SAGINAW R AT MIDLAND ST BRIDGE SAGINAW RIVER AT SAGINAW, MICH. WHITNEY DRAIN E B AUGRES R US 23	TAWAS R AT TAWAS CITY MI AUSABLE R AT DSCODA MI TAWAS R AT US 23 AT TAWAS CITY ST CLAIR RIVER AT PORT HURON, MICH.	
HYDROLOGIC Unit Code		04080104 04080201 04080201 04080202	04080202 04080203 04080203 04080203 04080203	04080203 04080203 04080203 04080203	04080204 04080204 04080204 04080204 04080204	04080204 04080204 04080204 04080204 04080205	04080205 04080205 04080206 04080206 04080300	04080300 04080300 04080300 04090001	

	 							
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OW END RABY	197	1974 1974 1974	1974 1974 1974 1974	197	197	1974	1976	
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BASIN DESCRIPTOR	00 4 00 4	904		% 8 8 8 8 8 8	004 024 004 004	00000 444444	000 4 4 4	
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DRAINAGE AREA	480.00 444.00 734.00	228800.00		522. 1042. 532.	762. 410. 332. 2318. 346.	6330. 428. 428. 88.	771.00 774.00 1251.00	
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LONGITUDE	0823705 0830023 0825700 0825435 0830744	0825731 0825731 0832808 0832802	0832723 0832644 0832558 0832441 0831624	0835440 0835440 0840433 0833152 0851019	0850603 0842547 0841558 0842357 0834117	0834246 0832141 0832129 0830021 0832056	0832056 0831256 0831142 0830932	
LATITUDE	430532 423214 423440 423545 421650	422050 422050 422402 422333 422306	422303 422219 422213 422200 435638	422313 422310 421004 415738 404430	405916 413016 405655 411415 410321	412658 412658 412658 404813	405522 410149 410239 411828	
STATION NAME AND LOCATION	BLACK RIVER NEAR FARGD, MICH RED RUN R 14 MILE RD BRIDGE WARREN CLINTON RIVER NEAR FRASER, MICH CLINTON RIVER AT MOUNT CLEMENS, MICH. RIVER ROUGE AT W.JEFFERSON AVE.	DETROIT R AT DETROIT MICH DETROIT R AT DETROIT, MICH. MIDDLE R ROUGE AB PHOENIX LK NR PLYMOUTH, MI MIDDLE R ROUGE BL PHOENIX LK NR PLYMOUTH, MI MIDDLE R ROUGE AB WILCOX LK AT PLYMOUTH, MI	MIDDLE R ROUGE BL WILCOX LK AT PLYMOUTH, MIC MIDDLE R ROUGE AT HAGGERTY RD AT PLYMOUTH, M MIDDLE R ROUGE AB NEWBURGH LK AT PLYMOUTH, M MIDDLE R ROUGE BL NEWBURGH LK NR PLYMOUTH, M PIGEON R AT M25 BRDG AT CASEVILLE	HURON R AT N. TERRITORIAL RD BR HURON RIVER NEAR DEXTER, MICH. R RAISIN AT SHARON VALLEY RD BR RIVER RAISIN NEAR MONROE, MICH WABASH RIVER AT BLUFFTON, IND	ST. MARYS RIVER NEAR FORT WAYNE, IND. TIFFIN R AT STRYKER OH AUGLAIZE R NR FORT JENNINGS OH AUGLAIZE R NR DEFIANCE OH BLANCHARD R NR FINDLAY OH	MAUMEE R AT WATERVILLE OH PORTAGE R AT WOODVILLE OH PORTAGE R AT RAILROAD BRIDGE AT WOODVILLE OH SANDUSKY R NR BUCYRUS OH TYMOCHTEE C AT CRAWFORD OH	TYMOCHTEE C AT CRAWFORD OH SANDUSKY R AT ST JOHNS BRIDGE NR MEXICO OH SANDUSKY R NR MEXICO OH SANDUSKY R NR FREMONT OH	
HYDROLOGIC UNIT CODE	04090001 04090003 04090003 04090003	04090004 04090004 04090004 04090004	04090004 04090004 04090004 04090004	04090005 04090005 04100002 04100002	04 100004 04 100006 04 100007 04 100007 04 100008	04 100009 04 100010 04 100011 04 100011	04100011 04100011 04100011	

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MISAB BOTGIRDS30	00000 44444	014	124 014 014	410 410 410	014 004 124	003 024 000 4	400
DRAINAGE AREA	1257.00 371.00 262.00 396.00 267.00	59.20	404.00 29.30 30.70	17.70 494.00 27.20	17.70 83.90 707.00	35.30 22.60 246.00 121.00 581.00	432.00
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3TAT2	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	6880	680 680 680 680 680	680 680 680 680 680	680 680 680 680	680 680 680 680	0398
LONGITUDE	0830733 0823625 0821901 08820617 0815314 0	0811000 0812030 0813245 0813510 0813118	08 13250 08 13254 08 13254 08 13502 08 13502	0813507 0813507 0813300 0813344	0813344 0813532 0813532 0813139 0813748	0814318 (0813251 (0812413 (0810248 (08102448 (0810248 (0810248 (0810248 (0810248 (08102448 (0810444848 (08104448 (08104448 (08104448 (08104448 (08104448 (08104448 (0	0803615 0 0785610 0 0785204 0 0784550 0
LATITUDE	411942 411806 412255 412259	412040 411005 410804 411930 410540	410808 410820 410820 410947	411228 411228 411429 4111429	411709 411902 411902 412304 412343	412701 413428 413751 415120 414426	415537 422750 425142 425840
STATION NAME AND LOCATION	1 SANDUSKY R AT FREMONT OH 2 HURON R AT MILAN OH 2 VERMILION R NR VERMILION OH 1 BLACK R AT ELYRIA OH 1 ROCKY R NR BEREA OH	CUYAHOGA R AT HIRAM RAPIDS OHIO CONGRESS LAKE OUTLET CUYAHOGA R AT OLD PORTAGE OHIO CUYAHOGA R BRECKSVILLE CHAFFEE RD L CUYAHOGA R BL OHIO CA AT AKRON OH	2 CUYAHOGA R AT OLD PORTAGE OH 2 MUD BK AT AKRON-PENINSULA ROAD NR AKRON OH 2 MUD BK NR AKRON OH 2 YELLOW C AT BATH ROAD NR BOTZUM OH 2 YELLOW C NR BOTZUM OH	FURNACE RN AT WHEATLEY ROAD NR EVERETT OH LEUNAHOGA R AT PENINSULA OH CUYAHOGA R AT PENINSULA OH BRANDYWINE C NR JAITE OH	BRANDYWINE C AT JAITE OH CHIPPEWA C AT RIVERVIEW ROAD NR BRECKSVILLE CHIPPEWA C NR BRECKSVILLE OH IINKERS C AT BEDFORD OH CUYAHOGA R AT INDEPENDENCE OH	BIG C AT CLEVELAND OH 3 EUCLID C NR EUCLID OH 3 CHAGRIN R AT WILLDUGHBY OH 3 ASHTABULA R NR ASHTABULA OH 4 GRAND R NR MADISON OH	CONNEAUT C AT CONNEAUT OH CATTARAUGUS CREEK AT GOWANDA NY BUFFALO R1 AT BUFFALO ELLICOTT C AT WILLIAMSVILLE NY
HYDROLOGIC Unit Code	04100011 04100012 0410001 04110001	04110002 04110002 04110002 04110002	04110002 04110002 04110002 04110002	04110002 04110002 04110002 04110002	04110002 04110002 04110002 04110002	04110002 04110003 04110003 04110004	04120101 04120102 04120103 04120104

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NIGBE WO RABY	1963 1970 1954 1964	1972 1964 1954 1954	1964 1975 1964 1964	1969 1964 1964 1964	1974 1974 1976 1977	1974 1954 1959 1964	1974 1974 1954 1964	
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DRAINAGE AREA	171.00 265000.00 47.70 11.50 30.30	289.00 7.76 22.00 21.90 26.00	21.90 577.00 14.20 11.20	40.60 41.20 981.00 19.20	90.00 20.80 5.00 21.99	35.90 153.00 181.00 7.45	32.60 58.60 68.80 333.00	
3712 3712	N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N S A S A S A S A S A S A S A S A S A S	S X X X X X X X X X X X X X X X X X X X	N M M M M M M M M M M M M M M M M M M M	N N N N N N N N N N N N N N N N N N N	
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LONGITUDE	0781120 0790347 0775030 0775543	0775727 0775843 0775731 0775917 0780054	0780238 0780436 0780628 0780554 0780554	0780748 0780812 0780547 0780233	0774216 0774122 0773506 0773735	0774144 0774255 0774607 0774420	0775514 0775201 0774945 0775026	
LATITUDE	425951 431540 420029 420403 420506	420720 420730 421002 421015	421831 421746 421853 422004 422137	422614 422823 422754 423413 423007	423208 423120 423113 423216 423216	423312 423340 423940 423449 424103	423519 423817 424050 424413	
STATION NAME AND LOCATION	TONAWANDA CREEK AT BATAVIA NIAGARA R(L ONTARIO) AT FOI CRYDER CREEK AT PAYNESVILL FORD BROOK AT STANNARDS NY CHENUNDA CREEK AT STANNARD	GENESEE RIVER AT WELLSVILLE NY 2 BRIMMER BROOK NEAR WELLSVILLE NY 2 VANDERMARK CREEK NEAR SCIO NY 2 KNIGHT CREEK AT SCIO NY 2 PHILLIPS CREEK NEAR BELMONT NY	BAKER CREEK NEAR ANGELICA NY 2 GENESEE RIVER AT TRANSIT BRIDGE NEAR ANGELIC 2 WHITE CREEK NEAR BELFAST NY 2 WIGWAM CREEK AT BELFAST NY 2 CRAWFORD CREEK AT ORAMEL NY	GENESEE RIVER AT HOUGHTON NY COLD CREEK AT HUME NY RUSH CREEK AT FILLMORE NY GENESEE RIVER AT PORTAGEVILLE NY SUGAR CREEK NEAR CANASERAGA NY	CANASERAGA CREEK ABOVE DANSVILLE NY 2 STONY BROOK AT STONY BROOK STATE PARK NY 2 MILL CREEK AT PATCHINVILLE NY 2 MILL CREEK AT PERKINSVILLE NY 5 MILL CREEK AT PERKINSVILLE NY	MILL CREEK AT DANSVILLE NY 2 CANASERAGA CREEK NEAR DANSVILLE NY 2 CANASERAGA CREEK AT GROVELAND NY 2 BRADNER CREEK NEAR DANSVILLE NY 2 WEST DITCH AT MOUTH NR SONYEA NY	2 KESHEQUA CREEK AT NUNDA NY 2 KESHEQUA CREEK AT TUSCARORA NY 2 KESHEQUA CREEK AT SONYEA NY 2 CANASERAGA CREEK AT SHAKERS CROSSING NY	
HYDROLOGIC UNIT CODE	04120104 04120104 04130002 04130002	04 130002 04 130002 04 130002 04 130002	04130002 04130002 04130002 04130002	04130002 04130002 04130002 04130002	04 130002 04 130002 04 130002 04 130002	04 130002 04 130002 04 130002 04 130002	04 130002 04 130002 04 130002 04 130002	

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LONGITUDE	0773845 0775021 0774003 0774105	0780715 0780816 0780337 0780236 0780230	0775700 0774730 0774052 0780400	0773740 0773659 0773137 0760430 0753709	0754951 0760011 0761220 0763020 0755530	0744743 0752245 0744645
LATITUBE	430723 424600 425314 425334	424139 424439 425054 425055	425847 430036 430526 420537 430602	431050 431326 430927 434848	430702 431535 431620 432706 435908	450022 443558 445149
STATION NAME AND LOCATION	ERIE(BARGE)CANAL AT ST HWY 383 AT ROCHESTER GENESEE RIVER AT JONES BRIDGE NR MOUNT MORRI LITTLE CONESUS CREEK NEAR SOUTH LIMA NY LITTLE CONESUS CREEK NEAR EAST AVON NY GENESEE RIVER AT AVON NY	DATKA CREEK AT ROCK GLEN NY DATKA CREEK AT WARSAW NY DATKA CREEK AT PEARL CREEK NY PEARL CREEK AT PEARL CREEK NY DATKA CREEK NEAR PAVILION CENTER NY	MAD CREEK NEAR LE ROY NY DATKA CREEK AT GARBUTT NY GENESEE R AT BALLANTYNE BRIDGE NEAR MORTIMER SPRING CREEK AT PUMPKIN HILL NY BLACK CREEK AT CHURCHVILLE, N.Y.	GENESEE RIVER AT ROCHESTER NY GENESEE RIVER(CHARLOTTE DOCKS)AT ROCHESTER N 042320502 IRONDE. C AT BRNCFT BLVD. ROCHESTE SANDY CREEK NEAR ADAMS, N. Y. EAST BRANCH FISH CREEK AT TABERG NY		ST LAWRENCE R AT CORNWALL ONT NR MASSENA, NY OSWEGATCHIE RIVER NEAR HEUVELTON, N.Y. ST REGIS RIVER AT BRASHER CENTER NY ST REGIS RIVER AT BRASHER CENTER NY
HYDROLOGIC Unit Code	04 130003 04 130003 04 130003 04 130003 04 130003	04130003 04130003 04130003 04130003	04130003 04130003 04130003 04130003	04130003 04130003 04140101 04140102	04 140202 04 140202 04 140202 04 140203 04 150101	04150301 04150302 04150306

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LONGITUDE	EGIC	0784502 0784040 0785403 0790633	0791903 0790800 0794636 0794348 0794348	0793955 0794248 0794210 0793957 0794031	0794144 0795238 0800254 0795722 0795248	0795059 0790330 0790200 0784335 0791233	0793430 0792340 0785058 0790637 0785508	0792027 0794622 0795700 0795740
LATITUBE		414856 (415616 (405901 (414921 (415109 415617 414438 414628 413959	414211 414018 413746 413725	412854 415723 414126 412615	412520 412530 412540 413556 411950	405859 405940 405749 405010	401733 403352 385605 385610
STATION NAME AND LOCATION	OHO	OHIO R AT MARKLAND DAM KY TURNIP RUN 3NNE WESTLINE PA B1 WEST BR AT BRADFORD PA WILLOW C AT WILLOW BAY RECREATION AREA PA BROWNS RUN AT WARREN, PA.	BROKENSTRAW CREEK AT YOUNGSVILLE, PA. CONEWANGO C 61035 BRDG OIL CR AT CENTERVILLE, PA. BRITTON RUN AT GLYDEN, PA. OIL CR NR HYDETOWN, PA.	SHIRLEY RUN NR BUELL CORNERS, PA. MCLAUGHLIN CR AT HYDETOWN, PA. OIL CR AT TITUSVILLE, PA. OIL CR AT TITUSVILLE, PA. CHURCH RUN AT TITUSVILLE, PA.	DIL CREEK AT ROUSEVILLE, PA. FRENCH C AT T 700 BRDG WOODCOCK C AT BLOOMING VALLEY, PA. FRENCH CREEK AT UTICA, PA. SUGAR CREEK AT SUGARCREEK, PA.	PATCHEL RUN NEAR FRANKLIN, PA. MUDDY FORK-BLO DAMG 4SE MARIENVL MUDDY FORK AT MOUTH-6SE MARIENVL WILSON RN AT DAHOGA, PA CLARION RIVER AT COOKSBURG, PA.	HALING RN AT VAN BUREN, PA REDBANK CREEK AT ST. CHARLES, PA. EB MAHONING C NR BIG RUN, PA LITTLE MAHONING CREEK AT MCCORMICK, PA. STONY CREEK AT FERNDALE, PA.	LOYALHANNA CREEK AT KINGSTON, PA. ALLEGHENY R AT NEW KENSINGTON, PA. ROARING CREEK AT NORTON W VA GRASSY RUN AT NORTON W VA
HYDROLOGIC Unit Code		05001900 05010001 05010001 05010001	05010001 05010002 05010003 05010003	05010003 05010003 05010003 05010003	05010003 05010004 05010004 05010004	05010004 05010005 05010005 05010005	05010006 05010006 05010006 05010006	05010008 05010009 05020001 05020001

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3TAT2	054 054 054 054	042 042 042 042	042 042 042 042	042 042 054 054	054 054 054 054 054	054 054 054 054 054	054 054 054 054	
LONGITUDE	0800225 0794012 0794111 0803425	0793822 0793704 0793704 0793433 0793500	0793546 0793634 0793728 0793516 0793516	0793539 0793601 0793704 0794005 0793530	0794130 0794127 0794126 0794119 0794124	0793956 0795210 0794417 0794416 0794141	0794149 0794614 0794602 0794000	
LATITUBE	390900 385524 385523 391825	395048 394744 394744 394651	394630 394609 394559 394549	394648 394631 394403 392100 390200	385512 385507 385517 385518 38552	385552 383700 384841 384827 385410	385427 385447 385758 392050	
STATION NAME AND LOCATION	TYGART VALLEY RIVER AT PHILIPPI, W. VA. TAYLOR RUN NEAR ALPENA, WV STALNAKER RUN NEAR BOWDEN, WV SALEM F SUBWATERSHED #11A VARNER H NR SALEM, SALEM FORK AT SALEM, W. VA.	BIG SANDY CREEK AT ROUTE 40 BIG SANDY CR AT WHARTON FURNACE BIG SANDY CREEK AT ELLIOTSVILLE STONY FORK AT CAMP RAIMO STONY FORK NEAR BETHEL CHAPEL	STONY FORK AT BAUER ESTATE STONY FORK NEAR ELLIOTSVILLE STONY FORK AT MOUTH STONY FORK TRIB NR GIBBON GLADE STONY FORK TRIB BELOW STATION 67	STONY FORK TRIB NORTH OF DELTA STONY FORK TRIB SOUTH OF DELTA LITTLE SANDY CR AT BEAVER BRIDGE CHEAT RIVER-4 RED RUN AT MOUTH	MILL RUN 4.3 MI EAST ELKINS MILL RUN 4.4 MI EAST ELKIKNS RICH CHAMP 493 MI EAST ELKINS RICH CHAMP RUN 4.4 MI E ELKINS STALNAKER RUN 4.4 MI EAST ELKINS	TAYLOR RUN 9.5 MI EAST ELKINS SHAVERS FORK 21 MI SOUTH ELKINS SHAVERS FK 9 MI SE ELKINS W.VA. SHAVERS FORK AT BEMIS, W. VA. SHAVERS FORK ABOVE BOWDEN, W. VA.	TAYLOR RUN AT BOWDEN W VA SHAVERS FORK BELOW BOWDEN, W. VA. SHAVERS FORK NR ELKINS, W. VA. CHEAT RIVER AT ROWLESBURG, W. VA.	
HYDROLOGIC Unit Code	05020001 05020001 05020001 05020002	05020004 05020004 05020004 05020004	05020004 05020004 05020004 05020004	05020004 05020004 05020004 05020004	05020004 05020004 05020004 05020004 05020004	05020004 05020004 05020004 05020004 05020004	05020004 05020004 05020004 05020004	

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LATITUDE	394651 394551	94627 94627 94627 9463	394559 394403 395523 395535	402419 393913 394208 395404 395135	394913 401414 403153 404033 403216	402608 402245 402209 402156 402208	401504 401638 402519 410521	
STATION NAME AND LOCATION	STONY FORK AT CAMP RIAMO, PA (42) STONY FORK TRIB NR GIBBON GLADE, PA (67) STONY FORK TRIB NR GIBBON GLADE, PA (67)	STONY FORK TRIB (BELOW GRANBAY SITE), PA (68 STONY FORK AT BETHEL CHAPEL, PA (44) STONY FORK TRIB #4 (N OF DELTA SITE), PA (73 STONY FORK TRIB #5 (S OF DELTA SITE), PA (75 STONY FORK NEAR ELLIOTTSVILLE, PA (51) STONY FORK NEAR ELLIOTTSVILLE, PA (51)	STONY FORK AT MOUTH AT ELLIOTTSVILLE, PA (52 LITTLE SANDY CREEK NR MOUTH, PA (101) SOUTH FORK TENMILE CREEK AT JEFFERSON, PA. DUNLAP CR NR NEW SALEM, PA.	MONONGAHELA RIVER AT BRADDOCK, PA. YOUGHIOGHENY RIVER AT FRIENDSVILLE, MD. CASSELMAN RIVER AT GRANTSVILLE, MD. MIDDLE C NR CASSELMAN, PA CASSELMAN RIVER AT MARKLETON, PA.	LAUREL HILL CREEK AT URSINA, PA. LITTLE CHARTIERS C AT LINDEN, PA OHIO RIVER AT SEWICKLEY, PA. L BEAVER C NR EAST LIVERPOOL OH YELLOW C NR HAMMONDSVILLE OH	KINGS CREEK AT WEIRTON,W.VA. HARMON CR NR BURGETTSTOWN, PA. HARMON CR AT HANLIN STATION, PA. HARMON C NR HANLIN STATION, PA HARMON CR AT W. VA PA. STATE LINE	CROSS C NR AVELLA PA N FK CROSS C AT AVELLA PA LITTLE SHENANGO RIVER AT GREENVILLE, PA. L NESHANNOCK C NR NESHANNOCK FALLS PA	
HYDROLOGIC Unit Code	05020004 05020004		05020004 05020004 05020005 05020005	05020005 05020006 05020006 05020006 05020006	05020006 05030101 05030101 05030101	05030101 05030101 05030101 05030101	05030101 05030101 05030102 05030102	

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ORAINAGE AREA	2235.00 3106.00 356.00		458.00 210.00 156.00 913.00 1515.00	3.96 1.04 943.00 12.98	6.55 146.00 253.00 160.00 455.00	464.00 140.00 5993.00 7422.00 116.00	207.00 7.15 2202.00 2341.70	
30 39YT 3TI2	* * * * * * * * * * * * * * * * * * *	NA NANAN	N N N N N	N N N N N N N N N N N N N N N N N N N	A A A A A A A A A A A A A A A A A A A	N N N N N N N N N N N N N N N N N N N	NA NA	
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LONGITUDE	0802014 0801855 0801433	0804404 0804420 0804454 0804434 0804333 0805527	0805950 0811214 0815255 0810550 0812325	0811500 0824213 0820516 0823641	0823519 0814435 0811536 0813437 0821709	0815910 0820853 0815959 0815100	0812427 0805402 0804445 0803701	
LATITUDE	405319 404548 404901	136 136 136 137 131 131	392830 393347 390349 385520 390335	374227 394250 391944 394111	394515 405647 404021 403924 402351	402853 400757 4007 13 393842 401341	362340 365551 365615 371722	
STATION NAME AND LOCATION	BEAVER RIVER AT WAMPUM, PA. BEAVER RIVER AT BEAVER FALLS, PA. CONNOQUENESSING CREEK NR ZELIENOPLE, PA.	SLIPPERY RUCK CREEK AI WORTEMBURG, SHORT C NR DILLONVALE OH OHIO RIVER AT BENWOOD NEAR WHEELING LITTLE GRAVE CREEK AT MOUNDSVILLE,W MIDOLE GRAVE CREEK AT MOUNDSVILLE,W CAPTINA C AT ARMSTRONGS MILLS OH	MIDDLE ISLAND CREEK AT LITTLE, W. VA. L MUSKINGUM R AT BLOOMFIELD OH SHADE R NR CHESTER OH LITTLE KANAWHA RIVER AT GRANTSVILLE, W. VA. LITTLE KANAWHA RIVER AT PALESTINE, W. VA.	SOAK CREEK NEAR SOPHIA, W. VA. N B HUNTERS RN NR HOOKER OH HOCKING R AT ATHENS OH TARHE RN AT MILL RD NR LANCASTER OH EWING RN AT RAINBOW RD NR LANCASTER OH	FETTERS RN AT RAINBOW RD NR LANCASTER OH CHIPPEWA C AT EASTON OH SANDY C AT WAYNESBURG OH SUGAR C AB BEACH CITY DAM AT BEACH CITY OH KOKOSING R AT MILLWOOD OH	KILLBUCK C AT KILLBUCK OH WAKATOMIKA C NR FRAZEYSBURG OH MUSKINGUM R AT DRESDEN OH MUSKINGUM R AT MCCONNELSVILLE OH N F LICKING R AT UTICA OH	SOUTH FORK NEW RIVER NEAR JEFFERSON, N. C. GLADE CREEK AT GRAHAMS FORGE, VA. NEW RIVER AT ALLISONIA, VA. NEW R AT EGGLESTON VA	
HYDROLOGIC Unit Code		05030106 05030106 05030106 05030106 05030106	05030201 05030201 05030202 05030203 05030203	05030203 05030204 05030204 05030204 05030204	05030204 05040001 05040001 05040001	05040003 05040004 05040004 05040004	05050001 05050001 05050001 05050002	

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BASIN DESCRIPTOR	014 004 004				0000 4444	004	004 004 014	
DRAINAGE AREA	3768.00 1625.00 137.00	2.84 52.20 25.50 4.57 6.58	528.00	268.00	11809.00 62.80 280.00 49.20 442.00	270.00 12.20 319.00 835.00 861.00	567.00 157.00 497.00	
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LONGITUDE	0805145 0800729 0800255 0804820 0800750	0811347 0810950 0810858 0811021 0811022	0800943 0801221 0802400 0803830	0800739 0800715 0800607 0800600	0815440 0813155 0813654 0813750 0814754	08 150 15 08 14948 08 15 110 08 14825 08 15029	0815239 0831150 0825920 0830155	
LATITUDE	372220 381703 381300 373825 381115	374431 374540 374514 374723 374742	382015 382109 381330 381730 381954	381949 381955 381927 381848 383550	383132 375808 380551 380610 381500	380345 380601 380917 381711 382020	374345 402510 403458 400637	***
STATIDN NAME AND LOCATION	NEW RIVER AT GLEN LYN, VA PRECIP MARLINTON GREENBRIER RIVER AT HILLDALE, W. VA.	CRAB ORCHARD CREEK AT CRAB ORCHARD, WV 4 PINEY CREEK AT RALEIGH, W. VA. 4 BEAVER CREEK AT BEAVER, WV 5 LITTLE WHITESTICK CR AT BECKLEY, W. VA. 6 CRANBERRY CREEK AT BECKLEY W. VA.	B MILES NW MARLINTON W.VA. LITTLE LAUREL 10MI NW MARLINTON HAMRICK RUN AT MOUTH GAULEY RIVER NEAR CRAIGSVILLE, W. VA.	8 MILES NNW MARLINTON W.VA. 7 MILES NNW MARLINTON W.VA. 7 MILES NNW MARLINTON W.VA. 7 6 MILES NNW MARLINTON W.VA. 7 ELK RIVER BELOW WEBSTER SPRINGS, W. VA.	KANAWHA RIVER AT WINFIELD, W.VA. CLEAR FORK AT WHITESVILLE, W. VA. BIG COAL R NR SETH WV LAUREL CR AT SETH WV BIG COAL RIVER NEAR ALUM CREEK,	LITTLE COAL RIVER AT DANVILLE, W. VA. ROCK CREEK NEAR DANVILLE WV LITTLE COAL RIVER AT JULIAN, W. VA. COAL RIVER AT ALUM CREEK, W. VA.	9 037.0 ROCKHOUSE CREEK AT MAN, W. VA. 1 SCIOTO R NR PROSPECT OH 1 OLENTANGY R AT CLARIDON OH 1 OLENTANGY R NR WORTHINGTON OH	
HYDROLOGIC UNIT CODE	05050002 05050003 05050003 05050003	05050004 05050004 05050004 05050004	05050005 05050005 05050005 05050005	05050007 05050007 05050007 05050007	05050008 05050009 05050009 05050009	05050009 05050009 05050009 05050009	05050009 05060001 05060001 05060001	

		 						
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BASIN DESCRIPTOR	004 000 004 004	000 4 4 4 4						
DRAINAGE AREA	190.00 122.00 189.00 534.00 228.00	5131.00 249.00 807.00 8.69 8.43	4.85 7.12 6.27 308.00 40.70	6.14 6.64 124.00 124.00	836.00 103.00			
TYPE OF SITE	8 8 8 8 0 0 0 0	A S S A S S S S S S S S S S S S S S S S	M S M S M S M S M S M S M S M S M S M S	M S A S A S A S A S A S A S A S A S A S	A A A A A A A A A A A A A A A A A A A	MS M	A A A A	
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LDNGITUDE	0825303 0825742 0825628 0830637 0831526	0825150 0832232 0831001 0812054 0812054	0812338 0812542 0813112 0813844 0813910	0812819 0812827 0814213 0814213	0815950 0820030 0814709 0812403	0812255 0814943 0811914 0814724 0815050	08 15209 08 138 18 08 15222 08 15002	
LATITUDE	400613 401056 395642 394202 394254	391244 392245 391549 373527	373819 373451 373516 373615	374044 374048 373726 373726	375010 375050 373303 373322 373423	373455 373539 373549 373702 374034	374127 374153 374348 37460?	
STATION NAME AND LOCATION	BIG WALNUT C AT CENTRAL COLLEGE OH ALUM C AT AFRICA OH ALUM C AT COLUMBUS OH BIG DARBY C AT DARBYVILLE OH DEER C AT MOUNT STERLING OH	SCIOTO R AT HIGBY OH PAINT C NR GREENFIELD OH PAINT C NR BOURNEVILLE OH ALLEN CREEK AT ALLEN JUNCTION, WV	MARSH FORK AT MABEN, WV STILL RUN AT ITMANN, WV BEARHOLE FORK AT PINEVILLE, WV GUYANDOTTE RIVER NEAR BAILEYSVILLE, W. VA. INDIAN CREEK AT FANROCK W. VA.	MILAM FORK AT MCGRAWS, WV MILAM FORK AT MCGRAWS, WV CLEAR FORK AT CLEAR FORK, W CLEAR FORK NEAR CLEAR FORK BUFFALO CREEK AT MAN, W.VA.	GUYANDOTTE RIVER AT LOGAN, W. VA. ISLAND CREEK AT LOGAN, W. VA. 028.0 LITTLE HUFF CREEK NEAR HANOVER, W. VA. 008.0 BARKERS CREEK AT TRALEE, W. VA. 009.1 CABIN CR AT JOE BRANCH W VA	006.0 SLAB FORK AT MULLENS, W. VA. 031.0 LITTLE HUFF CREEK AT JUSTICE, W. VA. 001.0 DEVILS FORK AT AMIGO, W. VA. 026.0 BIG CUB CREEK NEAR CUB CITY, W. VA. 035.0 ELK CREEK AT WYLO, W. VA.	036.0 SANDLICK CREEK AT BRUND, W. VA. 024.0 CLEAR FORK AT OCEANA, W. VA. 041.0 HUFF CREEK NEAR MAN, W. VA. 045.0 PIGHT FOPK AT ACCOVILLE, W. VA.	
HYDROLOGIC Unit Code	05060001 05060001 05060001 05060001	05060002 05060003 05060003 05070101	05070101 05070101 05070101 05070101	05070101 05070101 05070101 05070101	05070101 05070101 05070101 05070101	05070101 05070101 05070101 05070101	05070101 05070101 05070101	

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BASIN DESCRIPTOR		00 4 00 4						
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COUNTY	045 045 045 045 045	043 043 011 045	045 045 045 045	045 043 043 043	043 043 043 043	043 043 043 043	043 043 110	
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LONGITUDE	0815536 0815018 0815610 0815650	0821210 0820330 0820646 0821742 0815909	0815940 0815849 0820828 0820218	0820823 0820228 0820753 0820751	0820733 0815805 0821057 0821054	0821015 0821211 0821224 0820616 0821135	0821250 0821158 0821429 0821259	
LATITUDE	374606 374607 374848 375011	381315 381010 382315 382458 375244	375347 375549 375755 375809 375837	375840 380016 380133 380146 380248	380454 380532 380559 380647 380927	381037 381312 381554 381625 381712	381755 381823 381955 382003	
STATION NAME AND LOCATION	049.0 RICH CR AT EARLING, W. VA. 045.0 BUFFALD CR AT ACCOVILLE, W. VA. 050.0 RUM CR AT DABNEY, W. VA. 051.0 DINGESS RUN AT STOLLINGS, W. VA. 059.0 ISLAND CREEK AT MOUNT GAY, W. VA.	GUYANDOTTE RIVER AT BRANCHLAND, W. VA. MUD RIVER AT PALERMO, W. VA. MUD RIVER NEAR MILTON, W. VA. MUD RIVER AT BARBOURSVILLE W.VA. 068.0 CROOKED CR AT CROOKED CREEK, W. VA.	069.0 BUFFALO CR AT HENLAWSON, W. VA. 070.0 MILL CR AT PECKS MILL, W. VA. 076.0 BUCK FORK NEAR HARTS, W. VA. 071.0 CRAWLEY CR AT CHAPMANVILLE, W. VA. 077.0 BIG HARTS CREEK NEAR HARTS, W. VA.	078.0 SMOKEHDUSE FORK NEAR HARTS, W. VA. 075.0 BIG CR AT BIG CREEK, W. VA. 080.0 BIG HARTS CREEK AT HARTS, W. VA. 081.0 GUYANDOTTE RIVER AT HARTS, W. VA. 082.0 LITTLE HARTS CREEK AT ATENVILLE, W. VA	085.0 BIG UGLY CREEK AT GILL, W. VA. 104.1 MUD RIVER AT MUD, W. VA. 086.0 FOURTEENMILE CREEK NEAR RANGER, W. VA. 088.0 FOURTEENMILE CREEK AT RANGER, W. VA. 089.0 TENMILE CREEK NEAR MIDKIFF, W. VA.	090.0 NINEMILE CREEK AT MIDKIFF, W. VA. 093.0 FOURMILE CREEK AT BRANCHLAND, W. VA. 095.0 FALLS CREEK NEAR WEST HAMLIN, W. VA. 110.0 MUD RIVER AT HAMLIN, W. VA. 096.0 TWOMILE CREEK AT WEST HAMLIN, W. VA.	098.0 MADISON CREEK NEAR SALT ROCK, W. VA. 097.0 BEAR CREEK NEAR WEST HAMLIN, W. VA. 100.0 SMITH CREEK AT SARAH, W. VA. 099.0 TRACE CREEK AT SALT ROCK, W. VA.	
HYDROLOGIC Unit Code	05070101 05070101 05070101 05070101	05070102 05070102 05070102 05070102	05070102 05070102 05070102 05070102	05070102 05070102 05070102 05070102	05070102 05070102 05070102 05070102	05070102 05070102 05070102 05070102	05070102 05070102 05070102 05070102	

	 						
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BASIN Descriptor		004	00000 44444	0000 44000 4444	000 4 4 4 4		
DRAINAGE AREA		1.68 93.90 1507.00 3892.00	297.00 7.40 4.18 11.60 9.55	2.42 6.70 .82 6.20 393.00	554.00 48.80 12.60 112.00		
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LONGITUDE	0821551 0821527 0821727	0822435 0820600 0821953 0823053 0823805 0823805	0821145 0821229 0821530 0821438 0821452	0821817 0821808 0822016 0822114 0822515	0822035 0822245 0823444 0822957 0821449	0821525 0822051 0821907 0821920	0821805 0821745 0821752 0825213
LATITUDE	382005 382104 382259	7331 7331 7251 7471 8002 8101	372113 372045 372254 372407 372543	372523 372344 372657 372557 372557	37 18 14 37 16 30 37 16 38 37 25 24 37 22 10	372410 372609 372645 372656	372708 372709 372711 375050
STATION NAME AND LOCATION			LEVISA FORK AT BIG ROCK VA CONAWAY CREEK AT CONAWAY, VA. CARD CREEK AT MOUTHCARD, KY. FEDS CR AT FEDS CREEK, KY. BIG CREEK AT DUNLAP, KY.	ISLAND CREEK NEAR PHYLLIS,KY. LICK CR.AT LICK CREEK,KY. DICKS FORK AT PHYLLIS, KY. GRAPEVINE CREEK NR PHYLLIS, KY	RUSSELL FK AT ELKHORN CITY ELKHORN CR NR ELKHORN CREEK SHELBY CREEK AT DORTON, KY. SHELBY CREEK AT SHELBIANA KY LITTLE HACKNEY CREEK AT MOUTHCARD	CROOKED BRANCH NR FEDSCREEK FEDS HOLLOW NR PHYLLIS, KY HUNTERS CR AT PHYLLIS HONEY FORK AT PHYLLIS TRACE FORK NR PHYLLIS	LOWER CAMP BRANCH NR PHYLLIS GRAPEVINE CR ABOVE UPPER CAMP BR NR PHYLLIS UPPER CAMP BRANCH NR PHYLLIS PAINT CR NR MOUTH
HYDROLOGIC Unit Code	05070102 05070102 05070102	05070201 05070201 05070201 05070201 05070201	05070202 05070202 05070202 05070202	05070202 05070202 05070202 05070202	05070202 05070202 05070202 05070202	05070202 05070202 05070202 05070202	05070202 05070202 05070202 05070203

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NIZAB ROT91R3230	000 440 440	88888 444444	014	024	424 000 44 000 400	000 400 400 004 400	124	
DRAINAGE Area	1237.00 51.90 1701.00 62.10	56.30 14.80 3.74 20.40 6.21	206.00 103.00 2143.00	541.00	926.00 193.00 503.00 162.00	307.00 2511.00 197.00 275.00	120.00 3814.00 58.70 529.00	
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3TAT2	021 021 021 021	021 021 021 021	021 021 021 021	021 039 039 039	680 039 039	039 039 039 039	039 039 018 018	
LONGITUDE	0823914 0823105 0823840 0824638	0822729 0822705 082323 0822903 0822903	0824327 0825215 0824730 0824350 0824021	0823720 0840900 0840900 0842302 0842302	0841152 0842548 0842122 0842122	0834921 0841136 0841151 0843130 0842348	0843639 0844004 0850947 0850927	
LATITUDE	374160 372835 373213 374015	373401 373055 373511 373958 373758	374437 375005 374855 373456 381034	381008 401713 401713 401825 401825	400225 400608 400328 400328 400627	395836 394553 394555 394228 393810	393123 391547 395225 393423	
STATION NAME AND LOCATION	JOHNS FORK HEAD OF DEWEY LK LEVISA FORK AT PIKEVILLE, KY. MUD CR AT HAROLD LEVISA FORK AT PRESTONSBURG, KY. MIDDLE CR NR PRESTONSBURG	JOHNS CREEK NEAR META, KY. RACCOON CR. NR ZEBULON,KY. CANEY FORK NEAR GULNARE, KY. BRUSHY FK. AT HEENON,KY. BUFFALO CREEK NEAR ENDICOTT, KY.	JOHNS CR NR VAN LEAR,KY. PAINT CREEK AT STAFFORDSVILLE, KENTUCKY LEVISA FK AT PAINTSVILLE,KY. BEAVER CR BELOW ARKANSAS CR NR MARTIN BLAIN CR FALLSBURG	LOUISA KY W PI G MIAMI R AT SIDNEY OH G MIAMI R AT SIDNEY OH LORAMIE C NR NEWPORT OH LORAMIE C NR NEWPORT OH	G MIAMI R AT TROY OH GREENVILLE C NR BRADFORD OH STILLWATER R AT PLEASANT HILL OH STILLWATER R AT PLEASANT HILL OH MAD R NR URBANA OH	MAD R AT EAGLE CITY OH G MIAMI R AT DAYTON OH G MIAMI R AT DAYTON OH TWIN C NR INGOMAR OH TWIN C NR GERMANTOWN OH	SEVENMILE C AT COLLINSVILLE OH G MIAMI R AT NEW BALTIMORE OH WHITEWATER RIVER NEAR HAGERSTOWN, IND WHITEWATER RIVER NEAR ALPINE, IND	
HYDROLOGIC Unit Code	05070203 05070203 05070203 05070203	05070203 05070203 05070203 05070203	05070203 05070203 05070203 05070203	05070204 05080001 05080001 05080001	05080001 05080001 05080001 05080001	05080001 05080002 05080002 05080002	05080002 05080002 05080003 05080003	

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DRAINAGE AREA		200.00 380.00 1224.00 1.01	4.99 585.00 62000.00 59.60 242.00	400.00 12.20 387.00 218.00	48.90 28.90 129.00 28.90 17.10	63.20 219.00 1203.00 195.00	38.10 83170.00 140.00 827.00 84.70	119.00 2326.00 3385.00	
TYPE OF SITE		X X X X X X X X X X X X X X X X X X X	N N N N N N N N N N N N N N N N N N N	N N N N N	N N N N N	M M M M M M M M M M M M M M M M M M M	N N N N N N N N N N N N N N N N N N N	A M M M M M M M M M M M M M M M M M M M	
COUNTY		177 047 047 163 163	163 053 089 043 089	043 145 001 015	023 023 057 057 057	057 165 025 025 015	029 077 153 011 205	161 191 191 017	
3TAT2		018 018 039 039	039 039 021 021 021	021 021 039 039 039	680 039 039	039 039 039 039	021 021 021 021	021 021 021	
LONGITUDE		0845735 0850012 0850046 0821847 0821851	0821956 0822122 0825138 0831025	0825623 0825622 0831257 0832516 0835543	0834421 0834638 0835553 0834725 0834550	0835258 0840512 0841753 0840129 0844327	0850217 0845752 0830504 0833236 0832850	0834737 0841600 0842105 0841053	
LATITUDE		394357 392602 392424 392145 392148	392001 385225 383848 381757 383351	381947 381948 383837 384813 385129	394836 394940 394454 394525 394420	394322 392007 391017 390652 390008	390147 384629 374503 380655	383257 383552 384722 380607	
STATION NAME AND LOCATION		EAST FORK WHITEWATER RIVER AT ABINGTON, IND. EAST FORK WHITEWATER AT BROOKVILLE, IND WHITEWATER RIVER AT BROOKVILLE, IND SANDY RN AB BIG FOUR HOLLOW C NR LAKE HOPE O BIG FOUR HOLLOW C NR LAKE HOPE O	SANDY RN NR LAKE HOPE OH RACCOON C AT ADAMSVILLE OH OHIO R AT GREENUP DAM NR GREENUP, KY TYGARTS CREEK AT OLIVE HILL, KY. TYGARTS CREEK NEAR GREENUP, KY.	LITTLE SANDY R GRAYSON LITTLE SANDY RIVER AT GRAYSON, KY. UPPER TWIN C AT MCGAW OH OHIO BRUSH C NR WEST UNION OH WHITEOAK C NR GEORGETOWN OH	L MIAMI R NR SELMA OH N F L MIAMI R NR PITCHIN OH L MIAMI R NR OLDTOWN OH N F MASSIE C AT CEDARVILLE OH S F MASSIE C NR CEDARVILLE OH	MASSIES C AT WILBERFORCE OH TODD F NR RDACHESTER OH L MIAMI R AT MILFORD OH E F L MIAMI R NR MARATHON OH GUNPOWDER CR BELOW FLORENCE	SOUTH HOGAN CREEK NEAR DILLSBORO, IND. OHIO R AT MARKLAND DAM NR WARSAW, KY LICKING R NR SALYERSVILLE, KY. LICKING R AT FARMERS NORTH FORK TRIPLETT CREEK NEAR MOREHEAD, KY.	NORTH FORK LICKING RIVER NEAR LEWISBURG, KY. LICKING RIVER AT MCKINNEYSBURG, KY. LICKING RIVER AT BUTLER,KY. STRODES CR BELOW HOODS CR	
HYDROLOGIC Unit Code		05080003 05080003 05080003 05090101	05090101 05090101 05090103 05090103	05090104 05090104 05090201 05090201	05090202 05090202 05090202 05090202 05090202	05090202 05090202 05090202 05090202 05090203	05090203 05090203 05100101 05100101	05100101 05100101 05100101 05100102	

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OW BEGIN	1971 1979 1948	LL	1979 1979 1979 1979	1979 1979 1948 1979	1979 1970 1979 1970	1979 1948 1973 1979 1964	1948 1977 1977 1970	
BASIN BESCRIPTOR	000 000 004	900 0000 44 44444	00000 44444	00000 444444	88888 444444	00000 444444	004	
DRAINAGE AREA	40.90	177.00		1101.00	202.00	537.00 155.00 163.00	722.00	
TYPE OF	A A A	33 3333 30000	N N N N N	N N N N N	N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	
COUNTY	193 193 193	oo oo + 00	025 119 119 025	025 025 025 025 025	025 131 131 131 131	025 129 051 051 051	189 129 237 129	
STATE		021 021 021 021 021	021 021 021 021	021 021 021 021	021 021 021 021	021 021 021 021	021 021 021	
LONGITUDE	0830533 0831037	0831115 0831533 0831914 0830905 0830643 0833114	0831914 0830123 0830529 0830548 0831128	0831341 0831948 0832305 0832457 0831911	0832453 0832217 0832337 0831829 0832430	0833004 0833538 0833535 0834133	0834038 0834611 0832735 0834606	
LATITUDE	370648 371004 371448	371701 371409 372111 372201 372208 372655 372655	372756 372704 372957 373417 373507	373533 373157 373305 373304 373830	373734 370813 370918 370954 371351	372857 373318 371043 370450 370907	372845 373308 374832 373319	
STATION NAME AND LOCATION	LEATHERWOOD CREEK AT DAISY, KY. RIGHT FK MACYS CK NR FARLAR,KY. NORTH FORK KENTUCKY R AT HAZARD,KY.	LOTTS CREEK NR DARFORK,KY. BIG CREEK NR AVAWAN,KY. GRAPEVINE CK NR LAMONT,KY. TROUBLESOME CREEK NR ARY,KY BALLS FORK NR TALCUM,KY. BUCKHORN CREEK NR NOBLE,KY. TROUBLESOME CREEK AT NOBLE,	LOST CREEK NR LOST CREEK,KY. LAUREL FORK NEAR ELMROCK,KY. MIDDLE FK QUICKSAND CK NR DECOY,KY. HAWLS FORK NEAR TIPTOP,KY. CANEY CREEK NEAR CAMP LEWIS,KY.	HUNTING CREEK NR ROUSSEAU,KY. SOUTH FORK NEAR PORTSMOUTH NORTH FORK KENTUCKY RIVER AT JACKSON,KY. CANE CREEK NR JACKSON,KY. FROZEN CREEK NR TAULBEE,KY.	BOONE FORK NEAR VANCLEVE,KY. MIDDLE FORK KENTUCKY RIVER NEAR HYDEN, KY ROCKHOUSE CREEK NR HYDEN,KY. CUTSHIN CREEK AT WOOTON, KY. HELL FOR CERTAIN CK NR KALIOPI,KY.	TURKEY CREEK NEAR TURKEY,KY. MIDDLE FORK KENTUCKY RIVER AT TALLEGA,KENTUC RED BIRD RIVER NEAR BIG CREEK, KY. GOOSE CR NR GOOSEROCK, KY. GOOSE CREEK AT MANCHESTER, KENTUCKY	SOUTH FORK KENTUCKY RIVER AT BOONEVILLE, KENT KY R LOCK & DAM #14 RED R HAZEL GREEN KENTUCKY RIVER AT LOCK 14 AT HEIDELBERG, KY	
HYDROLOGIC Unit Code	05100201 05100201 05100201	05100201 05100201 05100201 05100201 05100201	05100201 05100201 05100201 05100201	05100201 05100201 05100201 05100201	05 100201 05 100202 05 100202 05 100202 05 100202	05 100202 05 100202 05 100203 05 100203 05 100203	05 100203 05 100204 05 100204 05 100204	

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OW END AA3Y	197	197			197	197		
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MIZAB AOT91R3230	004	014	000 4 4 4 4	900	000 4 4 4 00 4 4 4 4 4 4 4 4 4 4 4 4 4 4	014	004	
DRAINAGE AREA	65.80	5412.00	473.00 6180.00 437.00	188.00	1673.00 2.26 357.00 85.40 600.00	1848.00	5403.00 125.00 504.00	
TYPE OF	**************************************	A A A A A A A A A A A A A A A A A A A	A A A A A A A A A A A A A A A A A A A	A A A A A A A A A A A A A A A A A A A	A A A A A A A A A A A A A A A A A A A	X X X X X X X X X X X X X X X X X X X	A A A A A A A A A A A A A A A A A A A	
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3TAT2	021 021 021	021 021 021 021	021 021 021 021	021 021 021 021	021 021 021 021	021 021 021 021	021 021 021 021	
LONGITUDE	0832750 0845744 0844838 084528	0844044 0843052 0844441 0843939 0845254	0844853 0845748 0844926 0852811	0855953 0860420 0860242 0850810 0852338	0855310 0861024 0860243 0855953 0860721	0863008 0860140 0860234 0862551	0864122 0870016 0861945 0863305	
LATITUDE	374844 382617 384211 381031	374742 375330 373743 373830 381206	381607 382620 384218 371922 371513	372133 372249 373302 371133 370709	371605 371347 373303 372131 372043	370511 365633 364509 370004 365726	371436 371801 373531 373520	-
STATION NAME AND LOCATION	RED RIVER NEAR HAZEL GREEN, KY. KENTUCKY R LOCK #2 LOCKPORT EAGLE CR AT GLENCOE KENTUCKY R BELOW FRANKFORT SOUTH ELKORN CR KY HWY BRIDGE 314	KENTUCKY R BELOW JESSAMINE CK HICKMAN CR BELOW EAST&WEST FORK CLARKS RUN DANVILLE DIX R NR DANVILLE KENTUCKY R AT LOCK 4 AT FRANKFORT KY	ELKHORN CREEK NEAR FRANKFORT, KY KENTUCKY RIVER AT LOCK 2,AT LOCKPORT,KY. EAGLE CR. AT GLENCOE,KY. LITTLE PITMAN CK BELOW CAMPBELL GREEN R GREENSBURG WPI	BACON CR PRICEVILLE NOLIN R BROADFORD NOLIN RIVER WHITE MILLS GREEN R RESERVOIR RUSSELL CREEK NEAR COLUMBIA, KY.	GREEN RIVER AT MUNFORDVILLE, KY. WET PRONG BUFFALO CREEK NR MAMMOTH CAVE KY NOLIN RIVER AT WHITE MILLS, KY. BACON CREEK NEAR PRICEVILLE, KY. NOLIN RIVER AT WAX, KY.	BARREN R LOCK & DAM #1 BEAVER CR RACKY HILL BARREN R MAYNARD BARREN R AT BOWLING GREEN KY MUD R EAST OF EPLYS	GREEN RIVER AT ABERDEEN, KY. POND CR NR MARTWICK KY ROUGH R LK ROUGH RIVER AT FALLS OF ROUGH, KY	
HYDROLOGIC Unit CODE	05100204 05100205 05100205 05100205	05 100205 05 100205 05 100205 05 100205 05 100205	05 100205 05 100205 05 100205 05 110001	05110001 05110001 05110001 05110001	05110001 05110001 05110001 05110001	05110002 05110002 05110002 05110002 05110003	05110003 05110003 05110004 05110004	

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BASIN Descriptor	004 014 014	000	410		014 004 004	014	004	
DRAINAGE AREA	4 17 4	58.20 194.00 52.50	453.00 263.00 159.00 85.60	425.00 133.00 789.00 274.00 856.00	7267.00 139.00 509.00 670.00	138.00 542.00 29234.00 104.00 745.00	3102.00 241.00 25.50	
TYPE OF	3 3 3 S	A A A A A A A A A A A A A A A A A A A	SEE	MS M	MS M	N N N N N	N N N N N N N N N N N N N N N N N N N	
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3TAT2	021 021 021 021	021 021 021 021	0 18 8 10 8 10 8 10	8 t 0 0 1 8 1 0 0 1 8 1 0 0 1 8 1 0 0 1 8 1 0 0 1 8 1 0 0 1 8 1 0 0 1 1 1 1	018 018 018 018	018 017 018 018	017 017 018 018	
LONGITUDE	0863920 0864616 0871550	915 903 910 910 710	0851323 0850158 0852422 0860544	0852713 0845944 0861550 0863715	0865349 0865714 0865358 0870733	0872311 0880348 0875625 0874610 0882950	0880935 0880900 0852314 0853053	
LATITUDE	372750 373346 373202 373521	3708 2116 0720 0720 1157 2920	404336 403922 405414 404006 402540	404245 401649 404655 403525 410926	402519 394845 400256 395552 395656	390433 393933 380755 380458	380340 380300 401215 401545	
STATION NAME AND LOCATION	CANEY CREEK NEAR HORSE BRANCH, KY ROUGH RIVER AT DUNDEE, KY. GREEN RIVER AT LOCK 2, AT CALHOUN, KY. GREEN RIVER NR BEECH GROVE,KY.	SOUTH FORK PANIHER CREEK N POND R NR ISAACS CREEK POND R NR APEX POND RIVER NR APEX, KY. DRAKES CREEK NEAR WHITE PL CYPRESS C NR CALHOUN KY	CORNING GLASS BLUFFTON WABASH RIVER AT LINN GROVE, IND. LITTLE RIVER NEAR HUNTINGTON, IND. PIPE CREEK NEAR BUNKER HILL, IND. SALAMONIE RIVER AT PORTLAND, IND.	SALAMONIE RIVER NEAR WARREN, IND. MISSISSINEWA RIVER NEAR RIDGEVILLE, IND. EEL RIVER NEAR LOGANSPORT IND DEER CREEK NEAR DELPHI, IND. TIPPECANDE RIVER NEAR ORA, IND.	WABASH RIVER AT LAFAYETTE IND BIG RACCOON CREEK NEAR FINCASTLE IND SUGAR CREEK AT CRAWFORDSVILLE, IND. SUGAR CREEK NEAR BYRON, IND. EAGLE CREEK AT ZIONSVILLE, IND.	BUSSERON CR NR SULLIVAN IN SITE 114 EMBARRAS RIVER AT STATE HWY 133 NR OAKLAND. WABASH RIVER AT NEW HARMONY, IND. BIG CR NR WADESVILLE IN SITE 293 LITTLE WABASH RIVER AT LOUISVILLE, IL	LITTLE WABASH RIVER AT CARMI, IL CARMI WWKS B MUDDY R ROBOT WHITE RIVER AT MUNCIE, IND. KILLBUCK CREEK NEAR GASTON, IND.	
HYDROLDGIC Unit Code	05110004 05110004 05110005 05110005	05110005 05110006 05110006 05110006	05120101 05120101 05120101 05120101 05120101	05120102 05120103 05120104 05120105 05120106	05120108 05120108 05120110 05120110	05120111 05120112 05120113 05120113	05120114 05120114 05120201 05120201	

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ORGANIZA TION CODE	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	INOO1 USGS USGS USGS USGS	USGS USGS USGS USGS KYOO1	KYOO1 USGS USGS USGS USGS	USGS USGS USGS USGS
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OW END RAJY	197	197	197 197 197	197 197 196 196	197		
NIGGIN BABY	1954 1963 1978 1978	1978 1968 1968 1964	1973 1968 1978 1968 1969	1972 1966 1954 1968	1966 1978 1974 1963	1977 1970 1949 1979	1948 1979 1979 1979
NISA8 ROTGIADS30	014	003	004	004	000 44	0000 4400 444	0000 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
DRAINAGE AREA	828.00 169.00 4.40 212.00 2444.00	14.60 11305.00 794.00 326.00 245.00	184.00 421.00 78.80 474.00 303.00	155.00 2341.00 293.00 11.40	198.00 10.90 287.00 882.00	55.80 374.00	90.60
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3TAT2	810 810 810	018 018 018 018	018 018 018 018	810 810 810 810	018 018 018 021	021 021 021 021	021
LONGITUDE	0855746 0855205 0860714 0862256	0861455 0873300 0864945 0865835 0864548	0853433 0854655 0855727 0855951 0853803	0860330 0853932 0855357 0854026 0852910	0853713 0862507 0863803 0873255 0840738	0834134 0831452 0832121 0832745 0833332	0834119 0834428 0834327 0833609
LATITUDE	400746 395715 394345 393628	391545 382923 392627 393211 392600	394438 393145 393925 392139	385300 390503 385857 384815 390413	385834 391011 383510 382330 365809	364550 364457 365048 364519 364318	364305 364342 364317 364706
STATION NAME AND LOCATION	WHITE RIVER NEAR NOBLESVILLE IND FALL CREEK NEAR FORTVILLE, IND. BEAN CREEK AT INDIANAPOLIS, IND WHITE LICK CREEK NEAR MOORESVILLE, IND. WHITE RIVER NEAR CENTERTON IND	BEANBLOSSOM CREEK AT BEANBLOSSOM, IND. WHITE RIVER AT HAZLETON, IND. WILDCAT CREEK NR. LAFAYETTE, IND. BIG WALNUT CREEK NEAR REELSVILLE, IND. MILL CREEK NEAR CATARACT, IND.	BIG BLUE RIVER AT CARTHAGE, IND. BIG BLUE RIVER AT SHELBYVILLE, IND BUCK CREEK AT ACTON, IND. SUGAR CREEK NEAR EDINBURGH IND. FLATROCK RIVER AT ST. PAUL, IND.	KIEFFER PAPER BROWNSTOWN SAND CREEK NEAR BREWERSVILLE, IND. EAST FORK WHITE RIVER AT SEYMOUR IND MUSCATATUCK RIVER NEAR DEPUTY, IND. BRUSH CREEK NEAR NEBRASKA, IND.	VERNON FORK AT VERNON, IND. STEPHENS CREEK NEAR BLOOMINGTON, IND. LOST RIVER NR. WEST BADEN SPRINGS, IND. PATOKA RIVER NEAR PRINCETON, IND. LAUREL R RESERVOIR HGWY 312	CUMBERLAND R PINEVILL WPI MARTINS FK NR SMITH,KY. CUMBERLAND RIVER NEAR HARLAN,KENTUCKY PUCKETT CK NR PATHFORK,KY. BROWNICE CREEK NR OAKS,KY.	VELLOW CR NR MIDDLESBORD, KY. CLEAR CK NR PINEVILLE, KY. LITTLE CLEAR CK NR PINEVILLE, KY. STRAIGHT CK NR KETTLE ISLAND, KY.
HYDROLOGIC Unit Code	05120201 05120201 05120201 05120201	05120202 05120202 05120203 05120203	05120204 05120204 05120204 05120204	05120206 05120206 05120206 05120206	05120207 05120208 05120208 05120209 05130101	05130101 05130101 05130101 05130101	05130101 05130101 05130101 05130101

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OW END RABY						1974	
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BASIN ROT9IRD230	000 4400 4400 4400	00000 44444	00000 4 4 4 4 4	00 4 00 4 00	00 4 4 4 4	9000 44444	
DRAINAGE AREA	00.096	48.99 34.50 38.26 20.70 117.00	40.48 331.00 1607.00	103.00	954.00	82.30 .67 .85	66.00 27.90
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COUNTY	013 121 121 121 121	0013	013 235 235 235 151	235 147 147 125	147 147 203 125 199	095 147 147 199 199	147 001 013 013
3TAT2	02 02 02 1	047 047 047 047	021 021 021 047	021	021	021 021 021 021	021 047 047
LONGITUDE	0833936 0834225 0834444 0835313	0835936 0840020 0840836 0840432 0840242	0840953 0840642 0840930 0840807 0841901	0841520 0842118 0842036 0835956 0840447	0843200 0842939 0841748 0841746 0843713	0825935 0842657 0842855 0842752 0843603	0843237 0842532 0841918 0841949
LATITUDE	364754 365314 365402 365145	363246 363225 363026 363001 363300	363310 363802 364438 364708	364056 364255 365014 370334 370347	363737 364009 371016 371016 365943	365826 365205 365307 371238 365348	364331 360728 361234 361417
STATION NAME AND LOCATION	LEFT FK STRAIGHT CK NR CARY,KY. MIDDLE FK STINKING CK NR WALKER,KY. ROAD FORK CK NR BARNYARD,KY. CUMBERLAND RIVER AT BARBOURVILLE,KENTUCKY LITTLE INDIAN CK NR PERMON,KY.	CLEAR FORK AT HWY 90, AT ANTHRAS, TN. TACKETT CREEK AT ANTHRAS, TN STINKING CREEK NEAR NEWCOMB, TN. LICK CREEK AT HABERSHAM, TN HICKORY CREEK AT MORLEY, TN	ELK CREEK AT NEWCOMB,TN. CLEAR FORK AT SAXTON, KENTUCKY CUMBERLAND RIVER AT WILLIAMSBURG, KY. WATTS CK NR WOFFDRD,KY. JELLICO CREEK AT KETCHEN, TN.	JELLICO C NR WILLIAMSBURG MARSH CK NR DUCKRUN,KY. FY78 CHANGE OPERATION OWDC63228 TO TRIB TO LAUREL R NR LESBAS,KY. TRIB TO LAUREL R NR PINE GROVE,KY.	SOUTH FORK CUMBERLAND RIVER NEAR STEARNS, KY ROARING PAUNCH,KY. ROCKCASTLE R AT BILLOWS ROCKCASTLE R AT BILLOWS,KY. PITMAN CR BELOW SOMERSET STP	POOR FORK AT CUMBERLAND, KY CANE BRANCH NEAR PARKERS LAKE HELTON BRANCH AT GREENWOOD, KY. BUCK CREEK NEAR SHOPVILLE, KY LK CUMBERLAND BURMSIDE	SOUTH FORK CUMBERLAND R YAMACRAW NEW RIVER AT FORK MOUNTAIN, TENN NEW RIVER AT STAINVILLE, TENN BEECH FORK AT SHEA, TENN
HYDROLOGIC Unit Code	05130101 05130101 05130101 05130101	05130101 05130101 05130101 05130101	05130101 05130101 05130101 05130101	05130101 05130101 05130101 05130101	05130101 05130101 05130102 05130102	05130103 05130103 05130103 05130103	05130104 05130104 05130104 05130104

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MISAB Descriptor		004	004	004	0004	000 004 004	004	
DRAINAGE AREA	1.38 .67 17.20 2.19 32.80	.69 .92 .92 .10 198.00 42.50	21.50 48.70 382.00 27.10	1.11 70.25 .25 3.62 120.00	23.00 31.41 98.00 272.00 806.00	34.60	15.85 116.51 23.40 202.00	
TYPE OF	* * * * * * * * * * * * * * * * * * *	AS A	AS S AS S	M M M M M M M M M M M M M M M M M M M	MS MS MS	MS AS	AS SW	
CONNIX	151 151 151	151 151 151	151 151 151 151	049 049 049 129	129 151 151 151	147 147 231 049	049 049 049 049	
STATE	047 047 047 047 047	047 047 047 047	047 047 047 047	047 047 047 047	047 047 047 047	021 021 047 047	047 047 047	
LONGITUDE	0842459 0842419 0842414 0842417 0842227	0842314 0842307 0842201 0842706 0842513	0842655 0842659 0843222 0843317 0845435	0845740 0845033 0845443 0845450 0845450	0844215 0843913 0844126 0843749 0844009	0843544 0843334 0844125 0845740 0850953	0850406 0850240 0850034 0850135	
LATITUDE	361209 361239 361423 361614 361614	361904 361904 361943 362010 362316	362218 362414 362043 362308 361825	361532 361713 362330 362259 361928	361712 361916 362112 362318 362838	364210 364356 365021 361532	361142 361624 362306 362458	
STATION NAME AND LOCATION	GREEN BRANCH NEAR HEMBREE, TENN BILLS BRANCH NEAR HEMBREE, TENN SMOKY CREEK AT HEMBREE, TN BOWLING BRANCH ABOVE SMOKY JUNCTION, TENN SMOKY CREEK AT SMOKY JUNCTION, TENN		BUFFALO CREEK AT WINDNA, TENN PAINT ROCK CREEK NEAR HUNTSVILLE, TENN BRIMSTONE CREEK NEAR ROBBINS, TENN NEW RIVER AT NEW RIVER, TENN NORTH PRONG CLEAR FORK NEAR GRIMSLEY, TN	LONG BRANCH NEAR GRIMSLEY, TENN CLEAR FORK AT GATEWOOD, TN. CROOKED CREEK TRIBUTARY NEAR ALLARDT, TENN CROOKED CREEK NEAR ALLARDT, TENN CROOKED CREEK NEAR ALLARDT, TENN	BONE CAMP CREEK NEAR BURR BLACK WOLF CREEK NEAR GLE WHITE OAK CREEK AT RUGBY. CLEAR FORK NEAR ROBBINS, S F CUMBERLAND R AT LEATH	ROCK CK AT WHITE DAK JUNCTION, KY. WOLF CK AT WOLF CK, KY. SINKING CK NR GREGORY, KY. TRIB. TO S. PRONG CLEAR FORK R. EAST FORK OBEY RIVER AT OBEY CITY, TN	HURRICANE CREEK AT CAMP GROUND, TN. EAST FORK OBEY RIVER NEAR WILDER, TN. BUFFALO COVE C NR BOATLAND, TENN. FAST FORK MBEY RIVER MFAR HAMESTOWN, TENN.	
HYDROLDGIC Unit Code	05130104 05130104 05130104 05130104	05130104 05130104 05130104 05130104	05130104 05130104 05130104 05130104	05130104 05130104 05130104 05130104	05130104 05130104 05130104 05130104	05130104 05130104 05130104 05130105	05130105 05130105 05130105 05130105	

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SUSP DISCHARGE	4 44	4444	4 44	4444	4 4			
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2029 SED CONCEN	4 44	2444	4 44	44440	A O A O E	44444	ΣΣ	
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NISAB ROT4IRJ230	0000 4444	000 400 004	000 4 4 000 4 4 4 000	000 400 400 400	004 003 014		800	
DRAINAGE AREA	70.80 115.00 41.00 21.61	210.00 22.90 174.00 34.12 55.59	58.20 640.00 111.00 14.80 16.90	17.00 39.13 134.00 37.70 175.00	72.00 1678.00 38.00 1.15 10690.00		24.30 55.60	
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COUNTY	133 133 049 137	087 061 061 177	177 177 035 185 007	007 007 175 185	175 185 185 141 159	169 165	165 165 037 037	
3TAT2	047 047 047 047	047 047 047 047	047 047 047 047	047 047 047 047	047 047 047 047	047 047 047 047 047	047 047 047 047	
LONGITUDE	0851053 0851028 0845709 0845656 0850423	0853245 0853400 0854027 0854242 0854049	0855102 0854346 0851305 0851505	0851143 0851557 0852333 0852010 0852846	0853440 0853744 0853021 0853026 0855719	0860800 0860400 0860800 0860800	0862440 0862049 0865116 0864449	
LATITUDE	361852 362349 363214 363220 363337	362104 352335 353104 353417 353406	353432 354232 355328 355310 354546	354407 354535 354436 360153 355431	354204 354826 360454 360901 361453	361900 361600 361900 362100 362002	361837 362042 360904 360858	
STATION NAME AND LOCATION	WEST FORK OBEY RIVER NEAR ALLRED, TN WEST FORK OBEY RIVER NEAR ALPINE, TENN. WOLF RIVER AT WOLF RIVER, TN ROTTEN FORK WOLF RIVER NEAR PALL MALL, TN. WOLF RIVER NEAR BYRDSTOWN, TENN.	ROARING RIVER ABOVE GAINESBORD, TENN COLLINS RIVER AT BARKERTOWN, TN COLLINS RIVER NEAR TARLTON, TENN SCOTT CREEK AT IRVING COLLEGE, TN. HILLS CREEK NEAR IRVING COLLEGE, TN.	HICKORY CREEK NEAR VIOLA, TN COLLINS RIVER NEAR MCMINNVILLE, TENN. CANEY FORK AT CLIFTY, TENN. CLIFTY CREEK AT MOBRA,TN BEE CREEK AT LANTANA RD AT WINESAP, TN	BEAVERDAM CR AT LANTANA RD NEAR BELLVIEW, TN GLADE CREEK NEAR LONEWOOD, TN. CANE C NR SPENCER, TENN. CALFKILLER RIVER NEAR TAYLORS, TN CALFKILLER RIVER BELOW SPARTA, TENN.	ROCKY RIVER AT ROCKY R ROAD AT RIVERVIEW. TN CANEY FORK NEAR ROCK ISLAND, TENN. FALLING WATER R AT ST. HWY 42,NR COOKEVILLE. SHORT CREEK TRIB AT COOKEVILLE,TN CUMBERLAND RIVER AT CARTHAGE, TENN.		RICHLAND C AT CHARLOTTE AVE., AT NASHVILLE, INTERSTATE I-40 STORM SEWER AT NASHVILLE, TN	
HYDROLDGIC UNIT CODE	05130105 05130105 05130105 05130105	05130106 05130107 05130107 05130107	05130107 05130107 05130108 05130108	05130108 05130108 05130108 05130108	05130108 05130108 05130108 05130108	05130201 05130201 05130201 05130201	05130201 05130201 05130202 05130202	

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BASIN Descriptor	400	0004	014	000 440	004 4	8888 4444	000 4.000 4.44 4.44	
DRAINAGE AREA	262.00 165.00	237.00 681.00 681.00 124.00 244.00 65.60	935.00 27.50 31.80	1.55	476.00 97000.00 39.80 56.00	61.30 35.40 147.00 35.50	13.30 4.04 559.00 76.40	
TYPE OF SITE	3 8 8 8 8 8		A A A A A A A A A A A A A A A A A A A	A A A A A A A A A A A A A A A A A A A	MS M	NS NA	A A A A A A A A A A A A A A A A A A A	
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3TAT2	047	047 021 021 047 047 047	047 018 021 021 021	021 021 021 021	018 021 018 021 021	017 017 017 017	017 017 017 017	
LONGITUDE	0862002 0862443	086275 087055 087583 087324 087322 087431 086514	0870831 0851526 0852555 0855401 0854830	0852205 0854303 0854303 0855633	0861342 0864220 0864316 0873530 0874152	0883221 0885138 0884548 0884040 0883802	0883908 0883709 0882027 0882605	
LATITUDE	55506 55125	355625 360719 364757 364710 362055 364640 363047 363055	363317 385241 380305 375456 380710	381027 375906 375906 380004 374922	381415 375358 380819 374711	372820 374040 373919 373816 374341	374630 374633 374353 375301	
STATION NAME AND LOCATION	EAST FORK STONES RIVER NEAR	WEST FORK STONES RIVER NEAR SMYRNA, TENN. HARPETH RIVER NEAR KINGSTON SPRINGS, TENN. CUMBERLAND R BARKLEY LK LITTLE R BELOW NTS FORKS YELLOW CREEK NEAR SHILOH, TENN. LITTLE R NR CADIZ,KY. SULPHUR FORK RED RIVER ABOVE SPRINGFIELD, TE SULPHUR FORK RED RIVER NEAR ADAMS, TENN	RED RIVER AT PORT ROYAL, TENN INDIAN-KENTUCK CREEK NR CANAAN, IND. PLUM CREEK AT WATERFORD, KY. MILL CR BELOW FORT KNOX ROLLING FORK LEBANDN JUNCTION	PLUM CRK SUBWATER SHED NO 4 NR SIMPSONVILLE, SALT RIVER AT SHEPHERDSVILLE, KY. SALT RIVER AT SHEPHERDSVILLE, KY. SALT R NR MOUTH ROLLING FORK NR LEBANON JUNCTION,KY.	BLUE RIVER NEAR WHITE CLOUD, IND OHIO R AT CANNELTON DAM, KY MIDDLE FORK ANDERSON RIVER AT BRISTOW, IND. CANDE CREEK NEAR HENDERSON, KY BEAVERDAM CREEK NEAR CORYDON,KY.	LUSK CREEK 4MI SE OF EDDYVILLE SOUTH FORK SALINE RIVER AT NEW DENNISON, IL SUGAR CREEK NEAR STONEFORT, IL SOUTH FORK SALINE RIVER NEAR CARRIER MILLS. BANKSTON FORK NEAR CARRIER MILLS, IL	BRUSHY CREEK NEAR HARCO, IL BRUSHY CREEK TRIBUTARY NEAR HARCO, IL SALINE RIVER AT EQUALITY, IL RECTOR CREEK NEAR TEXAS CITY, IL	
HYDROLOGIC Unit CODE	05130203 05130203	05130203 05130204 05130205 05130205 05130205 05130206	05130206 05140101 05140101 05140102 05140102	05140102 05140102 05140102 05140102	05140104 05140201 05140201 05140202	05140203 05140204 05140204 05140204 05140204	05140204 05140204 05140204 05140204	

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DRAINAGE AREA	8.51 60.40 255.00 17.00	40330.00
TYPE OF STTE		3 3 3 5 5 5
COUNTY	165 047 033 107 233	7 1 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
3TAT2	017 021 021 021	0021
LONGITUDE	0882328 0873446 0873453 0873418	0884239
LATITUDE	373903 370430 371126 371746	370216
STATION NAME AND LOCATION	EAGLE CREEK NEAR EQUALITY, IL TRADEWATER R AT POOLS MILL BR NR DAWSON SPRI TRADEWATER RIVER AT OLNEY, KY. CLEAR C AT HWY 70 BR NR RICHLAND CRABORCHARD CK NR CLAY, KY	TENNESSEE RIVER AT HIGHWAY 60, NEAR PADUCAH, K MASSAC CREEK NR PADUCAH KY. OHIO R AT LOCK AND DAM 53 NR GRAND CHAIN ILL
HYDROLOGIC UNIT CODE	05140204 05140205 05140205 05140205 05140205	05140206 05140206 05140206

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DRAINAGE AREA	90	672.00 36.30 90.80 137.00	3747.00 67.90 40.40 296.00 18.60	66. 676. 79. 5.	945. 1332. 27. 55.	133.00 350.00 49.20 353.00 5101.00			
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3TAT2		013 051 047 037 047	047 037 037 037	037 037 037 037	037 037 037 037	037 037 047 047	037 037 037 037	037 037 037	
LONGITUDE	В Ж.	0823405 0822736 0814922 0821237	0834954 0824928 0824221 0823727	0823546 0823535 0824035 0822420 0823242	0823441 0823939 0825617 0825446 0825212	0825028 0825922 0830423 0833440 0834626	0820054 0820114 0820059 0820019 0820349	0820403 0820657 0821149 0821129	-
LATITUDE	SEE	363631 363342 361418 362040	360056 350832 351623 351756	352356 353007 353228 353911 353406	353632 354710 352346 352638 352742	353130 353807 354002 355242 355730	360347 360006 355851 355504 355219	355452 355546 355217 355432	
STATION NAME AND LOCATION	TENNESE	W CHICKAMAUGA C AT GA HWY 196 N F HOLSTON R NR GATE CITY VA REEDY CREEK AT OREBANK, TENN. WATAUGA RIVER NEAR SUGAR GROVE, N. C. DOE RIVER AT ELIZABETHTON, TENN.	HOLSTON RIVER NEAR KNOXVILLE, TENN. FRENCH BROAD RIVER AT ROSMAN N C DAVIDSON RIVER NEAR BREVARD, N.C. FRENCH BROAD RIVER AT BLANTYRE N C NORTH FORK MILLS RIVER ABOVE MILLS RIVER N C	MILLS RIVER NEAR MILLS RIVER, N. C. FRENCH BROAD RIVER AT BENT CREEK N C HOMINY CREEK AT CANDLER, N.C. BEETREE CREEK NEAR SWANNANDA N C SWANNANDA RIVER AT BILTMORE, N. C.	FRENCH BROAD RIVER AT ASHEVILLE, N. C. FRENCH BROAD RIVER AT MARSHALL, N. C. W FK PIGEON R AB LAKE LOGAN NEAR HAZELWOOD N W FK PIGEON R BL LAKE LOGAN NR WAYNESVILLE N EAST FORK PIGEON RIVER NEAR CANTON, N.C.	PIGEON RIVER AT CANTON, N. C. PIGEON RIVER NEAR HEPCO, N. C. CATALOOCHEE CREEK NEAR CATALOOCHEE N C LITTLE PIGEON RIVER AT SEVIERVILLE, TENN. FRENCH BROAD RIVER NEAR KNOXVILLE, TENN.	N TOE R NR FRANK NC N TOE R NR SPEAR NC N TOE R NR INGALLS NC N TOE R NR ALTAPASS NC GRASSY C NR SPRUCE PINE NC	N TOE R BL BUR C AT SPRUCE PINE NC N TOE R AT PENLAND NC S TOE AT CELO NC S TOF P. NP NEWDALF NC	
HYDROLDGIC Unit Code		060020 L 06010101 06010102 06010103	06010104 06010105 06010105 06010105	06010105 06010105 06010105 06010105	06010105 06010105 06010106 06010106	06010106 06010106 06010107 06010107	06010108 06010108 06010108 06010108	06010108 06010108 06010108 05010108	

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ON3 WO AA3Y		1979	1979		197	1968	197 197 197	·
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NIZA8 NOTAIRJ230	·	004 4	003	8888 4444	014		0 4 00 4 00 4	
DRAINAGE AREA		1.80 43.40 805.00 8934.00	106.00 269.00 15.70 11.80 30.80	33.80 19.00 21.10 62.30 95.90	17310.00 57.10 436.00 51.90	144.00	347.00 4.70 184.00	
TYPE OF	* * * * * * * * * * * * * * * * * * *	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	A S S A S A S S A S S A S S A S S A S S A S S A S A S S A S A S S A S	X X X X X X X X X X X X X X X X X X X	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	
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3TAT2	037 037 037 037	037 037 037 047	047 047 047 047	047 047 047 047	047 037 037 037 037	037 037 037 037 037	037 037 037 037	
LONGITUDE	0821346 0821959 0821814 0821813	0815823 0821152 0821104 0822727 0835142	0834241 0835304 0835858 0835946 0842735	0844843 0844417 0844756 0845308	0844700 0832339 0831740 0833139	0833922 0832916 0831323 0831456 0831730	0832452 0831538 0831830 0832113	
LATITUDE	360047 355416 355449 355448	355723 354842 354952 361035 355717	353952 354710 354608 354641 354220	354750 355114 355016 354302 354159	353713 350931 350708 352011 350735	351755 352330 352229 352208 352304	352554 352159 353112 352742	
STATION NAME AND LOCATION	N TOE R NR RED HILL NC CANE R AT BURNSVILLE NC MC INTOSH B NR BURNSVILLE NC MC INTOSH B AT BURNSVILLE NC CANE R NR BURNSVILLE NC	BRUSHY C NR INGALLS NC LOCUST CREEK NEAR CELD N C SOUTH TOE RIVER NEAR CELD, N. C. NOLICHUCKY RIVER AT EMBREEVILLE, TENN. TENNESSEE RIVER AT KNOXVILLE, TENNESSEE	LITTLE RIVER ABOVE TOWNSEND, TENN. LITTLE RIVER NEAR MARYVILLE, TENN PISTOL CR AT CALDERWOOD AVE AT ALCOA, TN CULTON CREEK AT ALCOA, TN POND CREEK NEAR ADOLPHUS, TN	WHITES CREEK AT BAKERS BRIDGE NEAR GLEN ALIC PINEY CREEK NEAR WESTEL. TN FALL CREEK NEAR OZONE, TN PINEY RIVER ABOVE SPRING CITY, TN PINEY R AT SPRING CITY TENN.	TENNESSEE RIVER AT WATTS BAR DAM (TAILWATER) CARTODGECHAYE CREEK NEAR FRANKLIN N C PEEKS CREEK AT SR 1678 NEAR GNEISS N C LITTLE TENNESSEE RIVER AT NEEDMORE, N. C. NANTAHALA RIVER NEAR RAINBOW SPRINGS, N. C.	NANTAHALA RIVER AT NANTAHALA, N. C. ALARKA C NR BRYSON CITY N C SCOTT C AT CITY HALL BR AT SYLVA SCOTT C BL SYLVA NC TUCKASEGEE R AT BARKERS CREEK NC	TUCKASEGEE R AT US 19 NR BRYSN CY TUCKASEGEE RIVER AT DILLSBORO, N.C. MINGUS CREEK AT RAVENSFORD OCONALUFTEE RIVER AT BIRDTOWN, N. C.	
HYDROLOGIC UNIT CODE	06010108 06010108 06010108 06010108	06010108 06010108 06010108 06010108	06010201 06010201 06010201 06010201	06010201 06010201 06010201 06010201	06010201 06010202 06010202 06010202	06010202 06010202 06010203 06010203	06010203 06010203 06010203	

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BASIN Descriptor	014	00 4 4 00 4 4 4 4	004	004	00 4 00 4	00000 444000	000	
DRAINAGE AREA	655.00 118.00 7.04 1126.00	1474.00 24.00 23.80 23.90 685.00	6.72 31.20 24.50 68.50	3343.00 30.30 82.50 19.50	31.20 83.20 139.00 38.40	153.00 518.00 18.40 50.30 33.70	764.00 43.30 32.30 117.00	
TYPE OF SITE	**************************************	M M M M M M M M M M M M M M M M M M M	X X X X X X X X X X X X X X X X X X X	A A A A A A A A A A A A A A A A A A A	A A A A A A	ASS ASS	AS AS AS	
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3TAT2	037 037 047 051	047 047 047 047	047 047 047 047	047 047 047 047	047 047 047 047	047 047 047 047	047 047 047 047	
LONGITUDE	0832650 0831538 0841644 0840426	0832354 0840733 0841335 0832251 0833749	0834426 0835459 0842334 0840927 0835916	0841803 0841816 0842023 0842130 0842130	0843000 0843731 0843654 0844924 0844801	0844446 0844015 0864001 0843318 0843644	0843329 0843550 0844213 0844453	
LATITUDE	352540 352159 352142 352351 363855	362530 362319 361825 363318 363230	363145 362636 355425 361314 360652	355307 360157 355955 355758 360200	355400 360802 360646 355953 361040	360718 360453 360310 360505 360040	355859 360858 353554 353453	
STATION NAME AND LOCATION	TUCKASEGEE RIVER AT BRYSON CITY, N. C. TUCKASEGEE R 31.6 AT DILLSBORO NC TELLICO RIVER AT TELLICO PLAINS, TENN. NF CITICO C NR TELLICO PLAINS TN CLINCH RIVER AT SPEERS FERRY, VA	CLINCH RIVER ABOVE TAZEWELL, TENN. BIG CREEK AT LA FOLLETTE, TENN COVE CREEK ABOVE COVE LAKE, NEAR CARYVILLE, MULBERRY CREEK AT ALANTHUS HILL, TN POWELL RIVER NEAR ARTHUR TN	OLD TOWN CREEK NEAR RED HILL, TN. DAVIS CREEK NEAR SPEEDWELL, TN K-25 PUMPING STATION COAL CR AT LAKE CITY TENN. BULLRUN CREEK NEAR HALLS CROSSROADS, TENN	CLINCH RIVER AT MELTON HILL DAM (TAILWATER). POPLAR C AT BATLEY RD NR OLIVER SPRINGS, TEN POPLAR CREEK NEAR OAK RIDGE, TENN. EAST FORK POPLAR CREEK NEAR OAK RIDGE, TENN.	ROCK CREEK NEAR GOBEY, TN EMORY RIVER NEAR WARTBURG, TENN. DADDYS CR NR HEBBERTSBURG, TENN. WHITE CREEK AT TWIN BRIDGES, TN	CLEAR C NR LANCING TENN OBED RIVER NEAR LANCING, TENN. ISLAND CREEK NEAR CATOOSA, TN CROOKED F NR WARTBURG TENN CRAB ORCHARD CREEK NEAR DEERMONT, TENN.	EMORY RIVER AT DAKDALE, TENN. EMORY RIVER AT GOBEY (035382968),TN LITTLE SEWEE CREEK NEAR CENTER POINT, TENN SEWEE CREEK NEAR DECATUR, TENN.	
HYDROLOGIC Unit Code	06010203 06010203 06010204 06010204	06010205 06010205 06010205 06010206 06010206	06010206 06010206 06010207 06010207	06010207 06010207 06010207 06010207	06010207 06010208 06010208 06010208	06010208 06010208 06010208 06010208	06010208 06010208 06020001 06020001	

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DRAINAGE AREA	50.05 57 18.1	21400.00 22.60 406.00 104.00	57. 177. 106. 202.	15.4 66.7 15.3 17.9	116. 50. 4. 28. 22640.	78.	342.	
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3TAT2	047 740 740 740 740	047 047 013 037 037	047 013 047 047	047 047 047 047	047 047 047 047	000 000 000 000 000 000 000 000 000 00	8888	
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LATITUDE	353017 352535 351805 350343	350512 350728 345155 350450	351939 344213 344724 353548	352415 352355 351919 351640	350747 350803 350448 350352 350041	355928 343900 344200 344328 342935	344908 344715 344713 343146	·
STATION NAME AND LOCATION	RICHLAND CREEK NEAR DAYTON, TENN. SALE CREEK NEAR SALE CREEK, TN SODDY C AT SODDY TENN WOLFTEVER CREEK NEAR OOLTEWAH, TENN NORTH CHICKAMAUGA CREEK NEAR DAISY, TN	TENNESSEE RIVER AT CHATTANDOGA, TENN. SUCK CREEK NEAR CHATTANDOGA, TN MILL CR4 PHEASANT BR HIWASSEE RIVER ABOVE MURPHY, N.C. VALLEY RIVER AT TOMOTLA, N. C.	DOSTANAULA CREEK NEAR SANFORD, TENN. MILL CR ABOVE HATCHERY TOCCOA RIVER NEAR DIAL, GA. SEQUATCHIE RIVER NEAR PIKEVILLE, TN SEQUATCHIE RIVER NEAR MT. AIRY, TN.	LITTLE BRUSH CREEK NR DUNLAP, TENN. BIG BRUSH CREEK NEAR DUNLAP, TN WOODCOCK CREEK SOUTHWEST OF DUNLAP, TN HICKS CREEK AT CARTWRIGHT, TN SEQUATCHIE RIVER NEAR WHITWELL, TENN.	L SEQUATCHIE R AT SEQUATCHIE, TENN. BATTLE CR NR MONTEAGLE TENN. KELLY COVE CREEK AT SMITHTOWN,TN SWEDEN CREEK NEAR SOUTH PITTSBURG, TN TENNESSEE RIVER AT SOUTH PITTSBURG, TENN.	CROW CREEK NEAR ANDERSON, TN GUNTERSVILLE RESERVOIR TENNESSEE RIVER NEAR MORGAN CITY, ALA.	FLINT RIVER NEAR CHASE AL FLINT RIVER NEAR CEDAR GAP, ALA. FLINT RIVER NEAR MOUNT CARMEL AL TENNESSEE R NR HOBBS ISLAND, ALA.	
HYDROLOGIC UNIT CODE	06020001 06020001 06020001 06020001 06020001	06020001 06020001 06020002 06020002	06020002 06020003 06020003 06020004 06020004	06020004 06020004 06020004 06020004	06020004 06030001 06030001 06030001	06030001 06030001 06030001 06030001	06030002 06030002 06030002 06030002	

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LATITUDE	343418 343741 343501 343435 344500	344150 343837 343933 343732 352129	351921 351748 351948 351628 352243	351708 350944 350804 351508	350127 345402 345453 345925 344500	344530 34466 342406 342435 342428	341644 341644 341655 341733	
STATION NAME AND LOCATION	TENNESSEE RIVER AT WHITESBURG AL ALDRIDGE NEAR LILY FLAGG AL ALDRIDGE CREEK NEAR WHITESBURG, ALA. TENNESSEE RIVER AT FARLEY, ALA. INDIAN CR AT U.S.HWY 72 NR HUNTSVILLE, ALA.	INDIAN CREEK NEAR MADISON AL INDIAN C 700 FT DS MARTIN RD NR HUNTSVILLE HUNTSVILLE SP BR AT MARTIN RD NEAR HUNTSVILL HUNTSVILLE SPRING BR PATTON RD NR HUNTSVILLE HUNTSVILLE SPRING BR PATTON RD NR HUNTSVILLE BELK RIVER NEAR MT. VIEW, TN	DRY CREEK NEAR MT.VIEW.TN ELK RIVER NEAR PELHAM, TENN. BETSY WILLIS CREEK NEAR PELHAM, TN MUD CREEK NEAR ALTO, TN BEANS CR AT US HWY 41, NEAR HILLSBORO, TN	ELK RIVER NEAR ESTILL SPRINGS, TENN. BOILING FORK CREEK NEAR DECHERD, TENN ELK RIVER ABOVE FAYETTEVILLE, TENN. WEAKLEY CREEK NEAR BODENHAM, TENN.	SHOAL CREEK AT IRON CITY, TENN. YELLOW CREEK NR DOSKIE, MS. YELLOW CREEK AT CROSS ROADS, MS. YELLOW CREEK AT MILE ONE NR PINE FLAT, MS. PICKWICK RESERVOIR	PICKWICK RESERVOIR < WF UPPER BEAR C NR MOUNT HOPE ALA EF UPPER BEAR C NR MOUNT HOPE ALA	AUSTIN B AT BEAR C ALA MILL C NR BEAR C ALA WHITEHEAD C NR FORKVILLE ALA WHITEHEAD C NR PEBBLE ALA	
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STATION NAME AND LOCATION	POSEY C NR POSEY MILL ALA L BEAR C BL BATESTOWN BRIDGE ALA BEAR C NR CARROLL CROSSROADS AL BEAR C NR NEWBURG ALA TENNESSEE RIVER AT PICKWICK LANDING DAM (LL)	DUCK RIVER BELOW MANCHESTER, TENN BUFFALO RIVER NEAR FLAT WOODS, TENN. BUFFALO RIVER NEAR LOBELVILLE, TENN. CUMBERLAND RIVER NEAR GRAND RIVERS, KY. TRACE CREEK ABOVE DENVER, TENN	BIG SANDY RIVER AT BRUCETON, TENN TENNESSEE RIVER HWY 60 NR PADUCAH CLARKS RIVER BENTDN CLOVER FORK AT HARLAN, KY.	WEST FDRK CLARKS RIVER NEAR BREWERS, KY. TENNESSEE R PICKWICK DAM
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LATITUDE	SP				473900	473220 471150 455140 463825 452002	450512 445830 450736 445640 451732	451335 450639 442705 443125	
STATION NAME AND LOCATION	UPPER MISSIS	FOX R AT WAUKESHA WI GRANT R AT BURTON WI CHIPPAWA R NR DURAND WISC TENMILE C NR NEKOOSA WI	BIG EAU PLEINE R NR STRATFORD WI DEAU CLAIRE R AT KELLY WI SPIRIT R AT SPIRIT FALLS WI TREMPEALEAU R AT ARCADIA WI FLAMBEAUR AT BABBS IS NR WINTE	S F FLAMBEAU R NR PHILLIPS WI FLAMBEAU R NR BRUCE WI HAY R AT WHEELER WI CHIPPEWA R 3 MILES E OF PEPIN BLACK R 3 MILES E OF GALESVILLE	LA CROSSE R AT LA CROSSE WISCONSIN R AT BRIDGEPORT YELLOW BANK R NR ODESSA MN WHETSTONE R NR BIG STONE CITY SD 1 RICE RIVER, FS ROAD 2182	ISLAND CK 11.5MI NW BENA,MN. BEAR RIVER,ROAD 65 MISSISSIPPI RIVER NEAR ROYALTON, MN CRDW WING RIVER AT NIMROD, MN	CROW RIVER AT ROCKFORD, MN MISS R MPLS BARGE TERM MPLS MINN MISSISSIPPI RIVER NEAR ANOKA, MN MISSISSIPPI RIVER AT ST. PAUL, MN WHETSTONE RIVER NEAR BIG STONE CITY, SD	YELLOW BANK RIVER NEAR ODESSA, MN CHIPPEWA RIVER NEAR MILAN, MN REDWODD RIVER AT MARSHALL, MN REDWOOD RIVER NEAR REDWODD FALLS, MN	
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STATION NAME AND LOCATION	MINNESOTA RIVER AT NEW ULM, MN COTTONWOOD RIVER NEAR NEW ULM, MN MINNESOTA RIVER AT MANKATO, MN BUFFALO CREEK DES MOINES RIVER AT JACKSON, MN	WATONWAN RIVER NEAR GARDEN CITY, MN JUDICIAL DITCH NO. 14 NEAR NEW SWEDEN, MN MINNESOTA RIVER NEAR JORDAN, MN ST. CROIX RIVER NEAR DAIRYLAND, WI ST. CROIX RIVER NEAR DANBURY, WI	BASHAW BROOK NEAR SHELL LAKE, WI CLAM RIVER NEAR WEBSTER, WI ST. CROIX RIVER AT ST. CROIX FALLS, WI CHIPPEWA RIVER NEAR BRUCE, WI NAMEKAGON RIVER NEAR HAYWARD, WI	NAMEKAGON RIVER AT TREGO, WI KETTLE RIVER NEAR CLOVERDALE, MINN SNAKE RIVER NEAR PINE CITY, MN MISSISSIPPI RIVER AT L&D #3 NEAR RED WING, M STRAIGHT RIVER NEAR FARIBAULT, MN	CANNON RIVER AT WELCH, MINN NORTH FORK WHITEWATER RIVER NEAR ELBA, MN WHITEWATER RIVER NEAR BEAVER, MN MISSISSIPPI RIVER AT WINONA, MN ZUMBRO RIVER AT ZUMBRO FALLS, MN	ZUMBRO RIVER AT KELLOGG, MN TREMPEALEAU RIVER AT ARCADIA, WI TREMPEALEAU RIVER AT DODGE, WI LA CROSSE RIVER NEAR WEST SALEM, WI MISSISSIPPI RIVER AT LA CROSSE, WIS.	MISSISSIPPI R MC LACROSSE WIS BLACK RIVER AT NEILLSVILLE, WI LEVIS CREEK AT BLACK RIVER FALLS, WIS. BLACK RIVER NEAR GALESVILLE, WI	
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STATION NAME AND LOCATION	BLACK RIVER AT HIGHWAY 93 NEAR ROOT RIVER NEAR LANESBORO, MN ROOT RIVER NEAR HOUSTON, MN SOUTH FORK ROOT RIVER NEAR HOU		SMITH CREEK NEAR PARK FALLS, WI PINE CREEK NEAR OXBO, WI FLAMBEAU RIVER AT BABBS ISLAND, WI SOUTH FORK FLAMBEAU RIVER NEAR PHILLIPS, WI FLAMBEAU RIVER NEAR BRUCE, WI	DOUGLAS CREEK NEAR PRENTICE, WI BRUSH CREEK EFFLUENT QUALITY JUMP RIVER AT SHELDON, WI CHIPPEWA RIVER AT CHIPPEWA FALLS, WI CHIPPEWA RIVER NEAR CARYVILLE, WI	CHIPPEWA RIVER AT DURAND, WI EAU GALLE RIVER AT SPRING VALLEY, WI PLUM CREEK NEAR ELLA, WI CHIPPEWA RIVER NEAR PEPIN, WI EAU CLAIRE RIVER NEAR FALL CREEK, WI	HAY RIVER OCOON CREEK COON CREEK NORTH FORK	PAINT CREEK AT WATERVILLE, IOWA MISSISSIPPI RIVER AT MCGREGOR, IOWA MISSISSIPPI RIVER AT MCGREGOR, I WISCONSIN R AT RAINBOW LK NEAR LAKE TOMAHAWK	
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DRAINAGE AREA	81.60	511.00 770.00 700.00	269.00 142.00 130.00 177.00	25.00 96.00 61.30	553.00 184.00 1760.00 200.00 375.00	224.00 36.90 26.50	363.00 2.24 19.00 44.00	
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STATION NAME AND LOCATION		BIG ROCHE A CRI CREEK NEAR ADAMS, WI BIG ROCHE A CRI CREEK NR ADAMS, WIS. YELLOW RIVER AT BABCOCK, WI LEMONWEIR RIVER AT NEW LISBON, WI HULBERT CREEK NEAR WISCONSIN DELLS, HULBERT CREEK NEAR WISCONSIN DELLS,		BARABOO RIVER NEAR BARABOO, WI BLACK EARTH CREEK AT BLACK EARTH, WI TROUT CR CONFLUENCE ARNESON CR NR BARNEVELD, TROUT CREEK AT TWIN PARKS DAM 8 NR BARNEVELD TROUT CREEK AT CTH T NEAR BARNEVELD, WI	TROUT CREEK NEAR RIDGEWAY, WI OTTER CREEK NEAR HIGHLAND, WI PINE RIVER AT SITE 36B NEAR HUB CITY, WI MALANCTHON CREEK AT SITE 21A NR HUB CITY, WI MALANCTHON CREEK AT SITE 21B NR HUB CITY, WI	W BR PINE RIVER AT SITE 14A4 NR BLOOM CITY, W BR PINE RIVER AT SITE 14B NR BLOOM CITY, W BR PINE R TRIB AT SITE 11A1 NR BLOOM CITY, W BR PINE R TRIB AT SITE 11B2 NR BLOOM CITY, W BR PINE R TRIB AT SITE 11B AT BLOOM CITY,	FANCY CREEK AT SITE 33A NR GILLINGHAM, WIS. FANCY CREEK AT SITE 33B NR GILLINGHAM, WIS. FANCY CREEK TRIB AT SITE 9A NR GILLINGHAM, W FANCY CREEK TRIB AT SITE 9R1 NR GILLINGHAM,	
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STATION NAME AND LOCATION	FANCY CREEK TRIB AT SITE 7A3 NR GILLINGHAM, FANCY CREEK TRIB AT SITE 7B NR GILLINGHAM, W HORSE CREEK AT SITE 32A1 NR RICHLAND CTR, WI HORSE C TRIB AT SITE 32A2 NR RICHLAND CTR, W HORSE CREEK AT SITE 32B NR RICHLAND CENTER,	BRUSH CREEK AT SITE 4A1 NR RICHLAND CENTER, BRUSH C TRIB AT SITE 4A2 NR RICHLAND CTR, WI BRUSH CREEK AT SITE 4B NR RICHLAND CENTER, W PINE RIVER AT RICHLAND CENTER, WIS.	ASH CREEK AT SITE 2B NEAR RICHLAND CENTER, W PINE RIVER AT TWIN BLUFFS, WIS. WISCONSIN RIVER AT MUSCODA, WI BADGER MILL CREEK NEAR VERONA, WI KICKAPOO RIVER AT ONTARIO, WI	KICKAPOO RIVER AT ONTARIO, WI KICKAPOO RIVER NEAR ROCKTON, WI KICKAPOO RIVER NEAR LA FARGE, WI KICKAPOO RIVER AT LAFARGE, WI	NORTH FORK NEDERLO CREEK NEAR GAYS MILLS. WI SOUTH FORK NEDERLO CREEK NEAR GAYS MILLS. WI NEDERLO CREEK AT UTICA TN HALL NR GAYS MILLS NEDERLO CREEK NEAR GAYS MILLS, WI KICKAPOO RIVER AT GAYS MILLS, WI	KICKAPOD RIVER AT STEUBEN, WI MISSISSIPPI RIVER AT CLINTON, IOWA I CROW C AT BETTENDORF IA 2 WAPSIPINICON R AT INDEPENDENCE, IOWA 3 WAPSIPINICON R NR DEWITT IOWA	WAPSIPINICON RIVER NEAR DE WITT, IOWA MISSISSIPPI R AT KEOKUK IOWA MISSISSIPPI R AT BURLINGTON IOWA EDWARDS RIVER NEAR NEW BOSTON, IL	
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STATION NAME AND LOCATION	HENDERSON CREEK NEAR GOUAWK	MISSISSIPPI RIVER AT KEOKUK, IOWA S SKUNK R BL SQUAW C NR AMES IOWA SOUTH SKUNK RIVER NEAR OSKALOOSA, IOW	NORTH SKUNK RIVER NEAR SIGDURNEY, IOWA SKUNK RIVER AT AUGUSTA, IOWA SKUNK RIVER AT AUGUSTA, IOWA CEDAR RIVER NEAR AUSTIN, MN	FOURMILE CREEK NEAR LINCOLN, IOWA HALF MILE CREEK NEAR GLADBROOK, IOWA FOURMILE CREEK NEAR TRAER, IOWA WOLF CR AT LAPORTE CITY, IOWA OTTER C NR CEDAR RAPIDS, IOWA	CEDAR RIVER AT CEDAR RAPIDS, IDWA PRAIRIE CREEK AT FAIRFAX, IOWA SUGAR C NR MOSCOW, IOWA CEDAR RIVER NEAR CONESVILLE, IOWA IOWA RIVER NEAR ROWAN, IOWA	IDWA R AT MARENGO IOWA IDWA R AT MARSHALLTOWN IOWA ITIMBER CREEK NEAR MARSHALLTOWN, IOWA RICHLAND CREEK NEAR HAVEN, IOWA SALT CREEK NR ELBERON, IOWA	WALNUT CREEK NEAR HARTWICK, IOWA BIG BEAR CREEK AT LADORA, IOWA IOWA RIVER NEAR MARENGO, IOWA RALSTON CREEK AT IOWA CITY, IOWA RAPID CREEK NEAR IOWA CITY, IOWA	CLEAR CREEK NR CORALVILLE, IOWA IOWA RIVER AT IOWA CITY, IOWA SOUTH BRANCH RALSTON CREEK AT IOWA CITY, IOW DLD MANS CR NR IOWA CITY, IOWA	
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STATION NAME AND LOCATION		ENGLISH RIVER AT KALONA, IOWA IOWA RIVER NEAR LONE TREE, IOWA IOWA RIVER AT COLUMBUS JUNCTION, IOWA RIVER AT WAPELLO, IOWA	WEST BRANCH ROCK RIVER NEAR WAUPUN, WI SOUTH BRANCH ROCK RIVER AT WAUPUN, WI EAST BRANCH ROCK RIVER NEAR MAYVILLE, WI KOSHKONONG CREEK NEAR SUN PRAIRIE, WI KOSHKONONG CREEK NEAR DEERFIELD, WI	YAHARA RIVER AT WINDSOR, TOKEN CREEK AT MADISON, W YAHARA RIVER AT STATE HWY SIX MILE C AT ST HWY 113 SIXMILE CREEK NEAR WAUNAK	SPRING CREEK NEAR WAUNAKEE. WI WARNER PARK STORM DITCH AT MADISON, WI PHEASANT BRANCH AT MIDDLETON, WI PHEASANT BRANCH AT CENTURY AVE AT MIDDLETON, PHEASANT BRANCH AT MOUTH AT MIDDLETON, WI	SPRING HARBOR STORM SEWER AT MADISON, WI WILLOW CREEK AT MADISON, WI WEST BRANCH STARKWEATHER CREEK AT MADISON, W EAST BRANCH STARKWEATHER CREEK AT MADISON, W OLBRICH PARK STORM DITCH AT MADISON, WI	NEVIN WETLAND SITE H AT MADISON, WIS. NEVIN WETLAND SITE F AT MADISON, WIS. NEVIN WETLAND SITE B AT MADISON, WIS. NEVIN WETLAND SITE G AT MADISON, WIS. NEVIN WETLAND SITE A AT MADISON, WIS.	NEVIN WETLAND SITE D AT MADISON, WIS. YAHARA RIVER NEAR MC FARLAND, WI DOOR CREEK NEAR COTTAGE GROVE, WI BADFISH CREEK NEAR COOKSVILLE, WI
HYDROLOGIC Unit Code		07080209 07080209 07080209 07080209	07090001 07090001 07090001 07090001	07090001 07090001 07090001 07090001	07090001 07090001 07090001 07090001	07090001 07090001 07090001 07090001	07090001 07090001 07090001 07090001	07090001 07090001 07090001 07090001

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LATITUDE	23633 23547	30600 24040 24710	24653 23034 25520 25411	423642 414700 413335 412920 420440	421515 414050 413645 420627 414114	413200 413514 414700 411445 412015	412525 412725 413430 413650 412527	411441 411655 411653 411309	
STATION NAME AND LOCATION	ROCK RIVER AT AFTON, WI TURTLE CREEK NEAR CLINTON, WI	MAUNESHA KIVER NEAK SUN PRAIKIE, WI CRAWFISH RIVER AT MILFORD, WI PECATONICA RIVER AT DARLINGTON, WI EAST BR PECATONICA RIVER NEAR BLANCHARDVILLE	PECATONICA RIVER NEAR BLANCHARD VILLE, WI PECATONICA RIVER AT MARTINTOWN, WI MOUNT VERNON, WI WEST BRANCH SUGAR RIVER NEAR BELLEVILLE, WI	SUGAR RIVER NEAR BRODHEAD, WI ROCK RIVER AT COMO, IL GREEN RIVER NEAR GENESEO, IL DES MOINES R NR BOONE IOWA	DES MOINES R NR STRATFORD IOWA DES MOINES RIVER NEAR SAYLORVILLE, IOWA DES MOINES RIVER AT DES MOINES, IOWA EAST FORK HARDIN CREEK NR. CHURDAN, IOWA MIDDLE RACCOON RIVER AT PANORA, IOWA	RACCOON R AT VAN METER IOWA WALNUT CREEK AT DES MOINES, IOWA M RACCOON R NR BAYARD, IOWA WHITEBREAST C NR DALLAS IOWA SOUTH R NR ACKWORTH IOWA	MIDDLE R NR INDIANOLA IOWA NORTH R NR NORWALK IOWA DES MOINES R. BL RACCOON R. AT DES MOINES, I FOURMILE CREEK AT DES MOINES, IOWA MIDDLE RIVER NEAR INDIANOLA, IOWA	WHITE BREAST CREEK NEAR DALLAS, IOWA DES MOINES R'NR TRACY IOWA DES MOINES RIVER NEAR TRACY, IOWA CEDAP CREEK NEAR RUSSEY, IOWA	
HYDROLOGIC Unit Code	07090001	07090003 07090003 07090003	07090004 07090004 07090004	07090004 07090005 07090005 07090007	07 100004 07 100004 07 100004 07 100004	07100006 07100006 07100007 07100008 07100008	07 100008 07 100008 07 100008 07 100008	07 100008 07 100009 07 100009	

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STATION NAME AND LOCATION	DES MOINES RIVER AT ST. FRANCISVILLE, MO. SUGAR CREEK NEAR KEOKUK, IOWA FOX RIVER AT BLOOMFIELD, IOWA. BAY C AT NEBO ILL HADLEY C AT KINDERHOOK ILLINOIS	MISSISSIPPI R AT HANNIBAL MISSOURI SALT R AT JOANNA MO MILL CREEK MISSISSIPPI RIVER AT ALTON, IL MISSISSIPPI RIVER BELOW ALTON,ILL	MISS R ALTON WATER INTAKE I KANKAKEE RIVER NEAR NORTH LIBERTY; IND. KANKAKEE RIVER AT SHELBY, IND. KANKAKEE RIVER AT MOMENCE, IL KANKAKEE RIVER AT MOMENCE, IL	IROQUDIS RIVER AT ROSEBUD, IND. IROQUDIS RIVER NEAR FORESMAN, IND. IROQUDIS RIVER AT IROQUDIS, IL IROQUDIS RIVER NEAR CHEBANSE, IL ILLINDIS RIVER AT MARSEILLES, IL	FOX RIVER AT WAUKESHA, WI MUKWONAGO RIVER AT MUKWONAGO, WI SUGAR CREEK AT ELKHORN, WI WHITE RIVER NEAR BURLINGTON, WI FOX RIVER AT BURLINGTON, WIS.	FOX RIVER AT WILMOT, WI FOX RIVER NEAR CHANNEL LAKE, IL NIPPERSINK CREEK NEAR SPRING GROVE, IL BIG CREEK AT ST. DAVID, IL BIG CREEK NEAR BRYANT, IL	SLUG RUN NEAR BRYANT,IL SANGAMON RIVER NEAR OAKFORD, IL IŁLINDIS RIVER AT VALLEY CITY BEAR CREEK AT CHESTERFIELD, IL	
HYDROLOGIC Unit Code	07 100009 07 110001 07 110004 07 110004	07110004 07110007 07110009 07110009	07110009 07120001 07120001 07120001	07 120002 07 120002 07 120002 07 120002 07 120005	07120006 07120006 07120006 07120006	07120006 07120006 07120006 07130005 07130005	07130005 07130008 07130011 07130012	

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LATITUDE	391610 391403 383128 383703 383020	380041 375722 371300 375405 375608	375301 374230 375758 375752 375642	375412 374455 393459 383229 382702	381546 384300 382620 382422 382528	382254 381926 381539 381517 380713	38 18 36 38 18 36
STATION NAME AND LOCATION	HODGES CREEK NEAR ROCKBRIDGE, IL MACOUPIN CREEK NEAR KANE, IL PRAIRIE DU PONT CREEK NEAR CENTREVILLE. IL MISSISSIPPI RIVER AT ST LOUIS MO MESAMEC RIVER NEAR EUREKA, MO	NORTH FORK COX CREEK AT STEELEVILLE, IL MARYS RIVER AT WELGE, IL MISSISSIPPI RIVER AT THEBES ILL BIG MUDDY RIVER AT PLUMFIELD, IL SIXMILE CREEK AT DOWELL, IL	LITTLE MUDDY RIVER NEAR ELKVILLE, IL SYCAMORE CREEK NEAR CARBONDALE, IL PIPESTONE CREEK NEAR DENMARK, IL BRUSHY FORK NEAR DENMARK, IL GALUM CREEK NEAR PYATTS, IL	BEAUCOUP CREEK NEAR VERGENNES, IL BIG MUDDY RIVER AT MURPHYSBORO, IL KASKASKIA RIVER AT COOKS MILLS, IL SUGAR CREEK AT ALBERS, IL KASKASKIA RIVER NEAR VENEDY STATION, IL	MUD CREEK NEAR MARISSA, IL SILVER CREEK NEAR TROY, IL HEBERERS BRANCH NEAR FREEBURG, IL SILVER CREEK NEAR FREEBURG, IL DOUGLAS CREEK NEAR SMITHTON, IL	WEST FORK RICHLAND CREEK AT FLORAVILLE, IL RICHLAND CREEK NEAR HECKER, IL DOZA CREEK NR LENZBURG, IL DOZA CREEK NEAR NEW ATHENS, IL LITTLE PLUM CREEK NEAR WALSH, IL	KASKASKIA RIVER AT ROOTS, IL BIG MUDDY RIVER NEAR MOUNT VERNON, IL
HYDROLOGIC Unit Cobe	07130012 07130012 07140101 07140101	07140105 07140105 07140105 07140106 07140106	07140106 07140106 07140106 07140106 07140106	07140106 B 07140106 B 07140201 P 07140204 S	07140204 07140204 07140204 07140204 07140204	07140204 07140204 07140204 07140204 07140204	07140204

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LONGITUDE	PPI	0892530 0892510 0891840 0892220 0891700	0891404 0891215 0891000 0892150 0892030	0891835 0890800 0892800 0891000	0891000 0890230	0890830 0890430 0890500 0890600	0890500		
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STATION NAME AND LOCATION	LOWER	R %SW PASS< AT EAST JETTY SOUND AB GRAND IS, MISS. BRETON SND AT MILE 14.1 BRETON SND AT MILE 19.0	AT TOWER 2 MILE 9.5 AT TOWER 3 MILE 6.0 AT TOWER 4 MILE 3.0 BRETON SND AT MILE 18.3 BRETON SOUND AT RANGE 2620	MR-GO AT MILE 13.7 MR-GO AT MI O.O %NAV LT C< BRETON SOUND S OF POINT GARDNER CHANDELEUR SND S OF CHICOT ISL CHANDELEUR SOUND W OF NORTH IS	CHANDELEUR SOUND SW OF NORTH IS CHANDELEUR SWD NR CHANDELEUR IS GULF OF MEXICO NR CHANDELEUR ISL CHANDLR SND 5.0 MI SE PT CHICOT GULF OF MEX E GRAND GOSIER IS	CHANDELEUR SND NR BRETON IS TRE B GULF OF MEX S GRAND GOSIER IS GULF OF MEX 5.75 MI W BRETON IS CHANDLR SND 10.0 MI SE PT CHICOT GULF OF MEXICO NR CHANDELEUR IS	CHANDLEUR SND 12 MI SE PT LYDIA CHAND SND 9 MI N W GRD GOSIER IS MISS RNEW ORLEANS-H.P. LONG BR MISSISSIPPI R AT NEW ORLEANS LA MURFREESBORO ARK	ARK LPHIA ARK ' ARK T ARK	
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LONGITUDE		0891400 0900425 0884930	0885750 0885120 0891133 0891747	0892334 0892035 0892439 0882601 0884839	0892313 0883107 0883600 0884653	0885836 0892235 0893614 0893823 0900210	0894805 0900415 0894908 0895458	
LATITUDE		363445 350737 365708	363742 362420 361504 362632 363145	362752 362309 362109 355956 360705	360149 344914 345556 350446	351631 352702 353814 351837 351120	350659 350500 350259 350021	
STATION NAME AND LOCATION	GLENWOOF MALVERN MOUNT IC	BAUXIIE AKK BENTON ARK YAZOD R AT REDWOOD MISSISSIPPI R HICKMAN MILE 920.5 MISSISSIPPI RIVER AT MEMPHIS, TENN.	BAYOU DECHIEN CLINTON NORTH FORK OBION RIVER NEAR MARTIN, TENN (CE OBION RIVER AT OBION, TENN. REELFOOT CREEK NEAR SAMBURG, TENN. RUNNING SLOUGH AT LEDFORD, KY	BIG SANDY CREEK AT NEW MARKHAM, TENN INDIAN CREEK AT SAMBURG, TENN REELFOOT LAKE SPILLWAY NEAR TIPTONVILLE, TN BEAVER CREEK AT HUNTINGDON, TENN. SOUTH FORK OBION RIVER NEAR GREENFIELD, TENN	N FK FORKED DEER RIVER AT DYERSBURG TENN (CE TOMBIGBEE RIVER AT ABERDEEN, MS. TUSCUMBIA RIVER CANAL NEAR CORINTH, MISS. MOSSES C NR POCAHONTAS, TENN. HATCHIE RIVER NEAR LACY, TN.	HATCHIE RIVER AT BOLIVAR, TENN. BIG MUDDY CREEK AT STANTON, TN HATCHIE RIVER AT RIALTO, TENN. LOOSAHATCHIE RIVER NEAR ARLINGTON, TENN. WOLF R.AT THOMAS ST BRIDGE HWY51	WOLF RIVER AT GERMANTOWN, TN MISSISSIPPI R MEMPHIS TENN MI 735.2 NONCONNAH CREEK NEAR GERMANTOWN, TENN. JOHNS CPEEK AT HOLMES POAD, AT CAPLEVILLE, T	
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BASIN DESCRIPTOR	014		014	024	024 024 024			
DRAINAGE AREA	1370.00	1788.00	2374.00 6475.00 4 6 51.00	6475.00	2106.00 535.00 768.00			
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LONGITUDE	0900056 0901210 0901832 0900832	0900752 0902139 0902417 0902547	0902745 0902556 0903333 0902905	0903926 0904048 0903923 0904305	0902309 0902012 0905242 0905310 0904500	0904545 0904745 0905030 0905010	0905440 0905335 0905205 0904828	
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STATION NAME AND LOCATION	HORN LAKE CREEK AT HORN LAKE, MISS. ST FRANCIS R AT FISK MO ST FRANCIS RIVER NR POWE, MO WILHELMINA CUT-OFF NR CAMPBELL, MO ST FRANCIS RIVER NR PIGGOTT, ARK	ST FRANCIS RIVER AT HOLLY ISL BIG SLOUGH DITCH NR PARAGOULC LOCUST CREEK DITCH NR PARAGOL EIGHT MILE DITCH NR PARAGOULC THOMPSON CREEK NR LESTER, ARP	BIG BAY DITCH NR LESTER, ARK ST. FRANCIS RIVER AT LAKE CITY, ARK. ST. FRANCIS RIVER AT PARKIN, ARK. ST. FRANCIS R FLOODWAY NR MARKED TREE, AR CROSS COUNTY DITCH NR BIRDEYE, ARK	STRAIGHT SLOUGH NR BIRDEYE, ARK ST. FRANCIS BAY AT RIVERFRONT, ARK. CLARK CORNER CUT-OFF NR COLT, ARK ST FRANCIS RIVER AT MADISON, ARK MARIANNA SEWAGE EFFLUENT (NEW POND)	COCKLE BURR SLOUGH DITCH NR BLACK OAK, ARK RIGHT HAND CHUTE OF LITTLE R AT RIVERVALE, A L'ANGUILLE RIVER NR COLT, ARK. L'ANGUILLE RIVER AT PALESTINE, ARK. L'ANGUILLE RIVER AT MARIANNA, ARK.	MARIANNA SEWAGE EFFLUENT (OLD) L'ANGUILLE RIVER & HWY 1 UNNAMED CREEK NR FORREST CITY, AR FORREST CITY OXIDATION POND CYPRESS CREEK NR PALESTINE, AR	SECOND CREEK NEAR HORTON, AR FIRST CREEK & HORTON, AR CANEY CREEK NR WYNNE, AR WYNNE OXIDATION POND	
HYDROLOGIC Unit Code	08010211 08020203 08020203 08020203	08020203 08020203 08020203 08020203	08020203 08020203 08020203 08020203	08020203 08020203 08020203 08020203	08020204 08020204 08020205 08020205	08020205 08020205 08020205 08020205 08020205	08020205 08020205 08020205 08020205	

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DRAINAGE AREA		1037.00	421.00 25555.00 160475.00 1130600.00	37.10 53.90	262.00		
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LONGITUDE	0905530 0904855 0904640 0904640	0904425 0904805 0904632 0911931 0911415	0910637 0911855 0911215 0911847	0895712 0895845 0901417 0901002 0901410	0893111 0901137 0901055 0894837 0901004	0901051 0901003 0901023 0901212	0901344 0901502 0901321 0901316
LATITUDE	351505 352405 352410 353040	353415 353430 353515 344208 351610	351507 344108 335720 335920 3333327	335940 335842 333158 333340 3333138	341623 333222 333303 334720 333343	333312 333240 333138 333108	332906 333012 332749 332748
STATION NAME AND LOCATION	BRUSHY CREEK NEAR WYNNE,AR WDLF CREEK NR CHERRY VALLEY, AR L'ANGUILLE RIVER NEAR CHERRY VALLEY,AR MCCRACKEN DITCH NEAR HARRISBURG,AR L'ANGUILLE RIVER NEAR HARRISBURG,AR	HARRISBURG OXIDATION POND SWAN POND DITCH NEAR HARRISBURG,AR HOLLOW BRANCH NEAR HARRISBURG,AR CACHE RIVER AT MOUTH NR. CLARENDON, AR. CACHE RIVER AT PATTERSON, ARK.	BAYDU DEVIEW AT MORTON, ARK. WHITE RIVER AT CLARENDON, ARK. ARKANSAS RIVER AT YANCOPIN ARKANSAS RIVER AT DAM NO. 2, NR GILLETT, ARK MISSISSIPPI RIV NR ARKANSAS CITY, ARK.	TILLATOBA CREEK BELOW OAKLAND, MISS. SOUTH FORK TILLATOBA CREEK NR CHARLESTON, MS TALLAHATCHIE R AB PEMBERTON CUT NR GREENWOOD BIG SAND CREEK AT MOUTH NEAR GREENWOOD, MISS YAZOO R AB PEMBERTON CUT NR GREENWOOD, MISS.	YOCONA RIVER NEAR OXFORD, MISS. TALLAHATCHIE RIVER AT GREENWOOD, MISS. TALLAHATCHIE R AB YALOBUSHA R AT GREENWOOD, YALOBUSHA RIVER AT GRENADA, MISS. YALOBUSHA R AB BIG SAND C NR GREENWOOD, MISS	YALOBUSHA RIVER AT MOUTH NEAR GREENWOOD, MISS YAZOO R TR AB GRENADA JCT NR GREENWOOD, MISS YAZOO R BL GRENADA JCT NR GREENWOOD, MISS. YAZOO RIVER AT US49 BYPASS AT GREENWOOD, MISSEFLUENT DRAIN AT ELEC PLANT AT GREENWOOD, M	YAZOO R AB WALKER LK PUMP PLANT NR GREENWOOD YAZOO RIVER AT FORT LORING, MISS. YAZOO RIVER AB PELUCIA CREEK NR GREENWOOD, M PELIJCIA CREEK AT MNITH NEAR RISING SUN, MISS
HYDROLOGIC Unit Code	08020205 08020205 08020205 08020205 08020205	08020205 08020205 08020205 08020301 08020302	08020302 08020303 08020401 08020401	08030202 08030202 08030202 08030202	08030203 08030205 08030205 08030205	08030205 08030205 08030205 08030205	08030205 08030206 08030206 090303030

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OW END RABY		1974 1978 1975 1967	1975		1972 1974 1972	1975 1974 1975 1973	1973	1972 1972 1970 1967	
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DRAINAGE Area		7650.00	12603.00	5391.00	67500.00	51.00	303.00 782.00 309.00	1128900.00 1128700.00	
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3TAT2		028 028 028 028 028	028 028 005 005 005	005 005 005 005	022 022 022 022 022	022 022 022 022 005	005 022 022 022 022	022 028 022 022	
LONGITUDE		0901400 0901619 0903430 0904305 0904900	0904902 0910045 0925600 0930500 0925000	0924905 0934000 0920629 0923100 0923400	0914125 0922634 0914300 0922634 0914327	0914108 0922634 0922430 0914942 0912055	0912010 0920427 0915537 0912830	0913612 0913725 0913549 0913730	
LATITUDE		332639 332348 341150 324853 322915	322914 324318 342800 3433000	333547 340400 330903 343300 343600	310355 311846 310535 311846 310235	310354 311846 313210 311618 330724	332743 320628 320421 322725 322555	310552 310030 310440 310020	
STATION NAME AND LOCATION	·	6 YAZOO RIVER AT ROEBUCK, MISS. 6 YAZOO RIVER NR SHELL BLUFF, MS. 7 BIG SUNFLOWER RIVER AT CLARKSDALE, MISS. 7 BIG SUNFLOWER RIVER AT HOLLY BLUFF, MS. 8 YAZOO RIVER BELOW REDWOOD	YAZOO RIVER AT REDWOOD, MS. 9 STEELE BAYOU NEAR ONWARD, MS. 1 JONES MILL 1 BURCHWOOD BAY - HOT SPRINGS 2 MAGNET-BUTTERFIELD-MALVERN	OUACHITA RIVER AT CAMDEN, ARK. MOUNT MORIAH - MURFREESBORO OUACHITA RIVER NR CROSSETT AR WEST BAUXITE - BENTON SALEM - BENTON	OLD R OUTFLOW CH NR KNOX LDG,LA. 1 RED RIVER AT ALEXANDRIA, LA. 1 RED R ABOVE OLD R OUTFLOW CH, LA 1 RED R AT ALEXANDRIA. 1 RED RIVER NEAR SIMMESPORT	1 OLD RIVER OUTFLOW CHANNEL NR KNOX LANDING 1 RED RIVER AT ALEXANDRIA, LA. (SEDIMENT) 4 BIG CREEK AT POLLOCK, LA 5 BLACK RIVER AT MOUTH 1 BOEUF RIVER NR EUDORA AR	1 DIVERSION CA BOEUF R AT MACON LK AR 1 OUACHITA RIVER AT COLUMBIA, LA. 1 BOEUF RIVER NEAR FT. NECESSITY 2 BAYOU MACON NEAR DELHI, LA. 3 TENSAS RIVER AT TENDAL, LOUISIANA	MISS RIVER NR COOCHIE LA O MISS RIVER AT TARBERT LDG, MISS. O OLD R INFLOW CH NR KNOX LDG., LA O MISSISSIPPI R AT TARBERT LANDING	
HYDROLOGIC Unit Code		08030206 08030206 08030207 08030207 08030208	08030208 08030209 08040101 08040101	08040102 08040103 08040202 08040203	08040301 08040301 08040301 08040301	08040301 08040301 08040304 08040305	08050001 08050001 08050001 08050002	08060100 08060100 08060100 08060100	

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OW END MA3Y	1967 1967 1975 1975	75	1956 1975 1975	1976 1976 1973 1967	1974 1974 1974	1973 1973 1973 1973	1972	· · · · · · · · · · · · · · · · · · ·
OW BEGIN	1965 1965 1972 1972	1974 1972 1974 1958 1954	1955 1955 1948 1953 1953	1952 1957 1944 1944 1965	1951 1951 1969 1946	1973 1973 1973 1973	1970 1970 1970 1972	
NISAB Rothirdrad	410	904	904	000 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	0004			
DRAINAGE AREA	1144500.00	2810.00 750.00 1129000.00	1243000.00	1243500.00 1280.00 1294.00	646.00 87570.00			
TYPE OF SITE	33 X X X X X X X X X X X X X X X X X X	NA N	SEES	AS S AS S	SW	88888	ES CN CN	
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3TAT2	028 028 028 028		022 022 022 022	022 022 022 022 022	022 022 022 022	022 022 022 022	022 022 022 022	
LONGITUDE	0905430 0905430 0905430 0905425 091375	09005 09041 09106 09139 09139	0913000 0911407 0913952 0913952	0911155 0905840 0905925 0905820 0902004	0902142 0914754 0912207 0911239 0911740	0911945 0912005 0911735 0912120 0912150	0912113 0912020 0912215 0912658	
LATITUDE	321830 321830 321845 320845	24226 22051 11920 05739 01738	300730 301731 305739 305739 304530	303025 300600 302750 302630	303023 305857 294209 294147 292720	292810 292550 292520 292435 292350	292520 292430 292430 294017	
STATION NAME AND LOCATION	MISSISSIPPI R VICKSBURG MISS MISS R AT VICKSBURG-MILE 435.3 MISSISSIPPI RIVER AT VICKSBURG, MS. MISSISSISPIP RIVER AT TARBERT LANDING ,MISS. RIGERIACK PREAR IS HWY 61	BIG BLACK RIVER NEAR CANTON, MISS. BIG BLACK RIVER NR BOVINA, MS. HOMOCHITTO RIVER AT ROSETTA, MS. MISS RIV AT RED RIV LANDING, LA. MISS RIVER AT PLAQUEMINE LA	BY CHENE CUT BL BY CHENE MI 75 BY PLAQUEMINE AT PLAQUEMINE LOCK LA MISSISSIPPI RIVER (TARBERT + RR LANDINGS) MISSISSIPPI RIVER (00060,70302,80155 /100) MISSISSIPPI RIVER NEAR ST. FRANCISVILLE, LA	MISSISSIPPI RIVER AT BATON ROUGE, LA. BAYOU LAFOURCHE AT DONALDSONVILLE, LA. AMITE RIVER NEAR DENHAM SPRINGS, LA. AMITE R AT 4H CAMP NR DENHAM SPRINGS TANGIPAHOA R NR PONCHATOULA LA	TANGIPAHOA RIVER AT ROBERT, LA. ATCHAFALAYA RIV AT SIMMESPORT, LA WAX LAKE OUTLET AT CALUMET, LA. LOWER ATCH R AT MORGAN CITY, LA. ATCH. BAY 1.5 MI SW OF SHELL IS	ATCH. BAY 3.5 MI SW OF SHELL IS ATCH. BAY 3.75 MI SW OF SHELL IS ATCH. BAY 4.25 MI SW OF SHELL IS ATCH. BAY 5.5 MI SW OF SHELL IS ATCH. BAY 6.5 MI SW OF SHELL IS	ATCH BAY 5.0 MI SW OF SHELL IS ATCH BAY 0.75 MI E OF LIGHT 43 ATCH BAY 0.75 MI W OF LIGHT 43 IWW AT WAX LK W CONTROL STR LA	
HYDROLOGIC Unit Code	08060100 08060100 08060100 08060100		08070100 08070100 08070100 08070100	08070100 08070100 08070202 08070202	08070205 08080101 08080101 08080101	08080101 08080101 08080101 08080101	08080101 08080101 08080101 08080101	

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SUSP DISCHARGE		ОШАА	44444	Am m	4 44	Ш		
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OW BEGIN	1971 1971 1971 1971	1965 1952 1975 1975 1975	1973 1975 1975 1975	1975 1966 1949 1968	1953 1944 1969 1972	1972 1970 1971 1974 1974	1974 1974 1974 1974	
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DRAINAGE AREA		87570.00			1381.00 1700.00 2310.00		1129970.00	
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COUNTY	101 101 101 101 000	101	660 660 660	099 099 113 113	053 003 019 019	019 075 075 075	075 075 075 075	
3TAT2	022 022 022 022	022 022 022 022 022	022 022 022 022	022 022 022 022 022	022 022 022 022 022	022 022 022 022 022	022	
LONGITUDE	0911430 0911405 0911529 0911610	0911230 0914754 0912646 0912719	0912940 0913212 0913155 0913549 0914306	0913819 0914945 0921140 0921820 0921548	0923525 0925455 0931118 0931903 0931818	0931817 0892105 0891600 0891615	0891540 0891510 0891615 0891615	-
LATITUDE	293930 293518 293235 293032 305800	294145 305857 295340 295333 300722	300725 300831 301245 301248	302155 300415 294700 293316 294528	301123 303010 301759 300549	300624 291545 291100 290930 290920	290830 290825 290800 291015	
STATION NAME AND LOCATION	1 LWR ATCH RIVER AT GIWW MI 120.8 1 LWR ATCH R AT N END SWEET BAY LK 1 LWR ATCH R AT AVOCA IS CUT-OFF BY 1 LWR ATCH R AT SHELL IS PASS 1 ATCHAFALAYA RIVER AT SIMMESPORT	ATCHAFALAYA-RR BR. AT MORGAN CTY ATCHAFALAYA RIVER AT SIMMESPORT. LA. CHICOT PASS AT MYETTE POINT (CE 03540) GRAND LAKE NW OF MYETTE POINT ATCHAFALAYA RIVER BASIN BAYOU SORREL	ATCHAFALAYA R. ABOVE MOUTH OF BAYOU SORREL ATCHAFALAYA RIVER BASIN BAYOU CHENE ATCHAFALAYA RIVER BASIN LITTLE TENSAS BAYOU ATCHAFALAYA RIVER BASIN BAYOU L'EMBARRAS ATCHAFALAYA RIVER AT INTERSTATE 10	WHISKEY BAY PILOT CHANNEL AT INTERSTATE 10 BAYOU TECHE AT KEYSTONE LOCK, NR ST.MARTINVI IWW AT VERMILION LOCK %EAST FRESHWATER CANAL AT LOCK NORTH SCHOONER BAYOU AT CNTL STR, EAST	MERMENTAU RIVER AT MERMENTAU CALCASIEU RIVER NR KINDER LA CALCASIEU R NR LAKE CHARLES CALCASIEU RIVER AB DEVILS ELBOW CALCASIEU RIVER BL DEVILS ELBOW	INDUSTRIAL CANAL AT DEVILS ELBOW THE JUMP AT VENICE, LA. MISSISSIPPI R AT MI 2.8 AHP LA MISSISSIPPI RIVER AT MILE O.7 AHP MISSISSIPPI RIVER AT MILE O.2 AHP	MISSISSIPPI RIVER AT MILE O.3 BHP MISSISSIPPI R AT HEAD OF PASSES SOUTHWEST PASS AT MILE 1.3 BHP MISSISSIPPI RIVER AT MILE 1.2 AHP	
HYDROLOGIC Unit Code	08080101 08080101 08080101 08080101	08080101 08080101 08080101 08080101	08080101 08080101 08080101 08080101	08080101 08080102 08080103 08080202	08080202 08080203 08080203 08080206 08080206	08080206 08090100 08090100 08090100	08090100 08090100 08090100 08090100	

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NISA8 ROT91A3230			004					
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TYPE OF SITE	E O S S		A A A A A A A A A A A A A A A A A A A	N N N N N		N N N N N N N N N N N N N N N N N N N	SEES	
YTNUOD	075 075 075	057 057 051 057 075	103 089 089 103 095	103 103 105 105 089	051 051 103 071	071 071 087 071	071 071 071 071	
3TAT2	022 022 022	00000	022 022 022 022	022 022 022 022 022	022 022 022 022 022	022 022 022 022 022	022 022 022 022	
LONGITUDE	0891450 0891300 0891330	0901910 0902045 0900140 0990840 0895840	0901010 0902310 0902205 0895720	0900545 0900733 0901020 0901615 0901930	0900905 0901500 0894612 0895130 0895400	0894903 0895730 0891800 0895524 0895626	0895650 0900155 0900115 0894310	
LATITUDE	290815 290840 291015	92055 92320 93105 91330 95125 01500	302940 300415 300450 301500	302131 301116 302150 301945 300600	300125 300415 301136 300945 301318	300555 300700 300615 300024 300017	295850 300205 295915 300942	
STATION NAME AND LOCATION	O SOUTH PASS AT MI O.6 BHP LA O PASS A LOUTRE AT MI 1.8 BHP LA O GUTLET OF SOUTH PASS AT MI 4.7 W	GRAND BY BLUE 2 MI AB BY CO GRAND BAYOU BLUE AT BAYOU F. BARAT WW 2.5 MI BL UCT BY CI CAMINADA BAY NR BAY ST HONOI MISSISSIPPI RIVER AT BELLE LK PONT 6.5 MI SE TANGIPAHO	1 TCHEFUNCTA RIVER NEAR COVINGTON, LA. 2 L PONT 1.5 MI N OF BY LA BRANCHE 2 L PONT 2.25 MI NNW BY LA BRANCHE 2 LK PONTCHARTRAIN AT BY LACOMBE 2 LK PONTCH AT ENTR PAS MANCHAC	LAKE PONTCHARTRAIN AT MANDEVILLE 2 LK PONT CENTER GR N.O. EXPY BR 2 LK PONTCH AT TCHEFUNCTA RIVER 2 LK PONTCH AT TANGIPAHOA RIVER 2 L PONT 5 MI NE BONNET CARRE SPLY	LK PONT S END OF GR N.O. EXPY BR 2 L PONT 5.5 MI N MOISANT INTNL AP 2 LK PONTCHARTRAIN AT HOWZE BEACH 2 LK PONT AT S BASCULE HWY 11 BR 2 LK PONTCH A MI SE OF BY LACOMBE	LK PONTCH AT CHEF MENTEUR PASS 2 L PONT 3.5 MI NW OF LITTLE WOODS 3 LK BORGNE 9.5 MI E LE PETIT ISL. 3 MISS RIVER-GULF OUTLET AT IWW 3 IWW AT PARIS RD BRIDGE N.O., LA.	BAYOU BIENVENULE AT HIGHWAY 47 3 LK PONTCHARTRAIN AT IHNC ENTR 3 IHNC AT JCT WITH IWW, MI 2.0 3 RIGOLETS, OPPOSITE SAWMILL PASS	
HYDROLOGIC Unit Code	08090100 08090100	08090100 08090100 08090100 08090100 08090100	08090201 08090202 08090202 08090202	08090202 08090202 08090202 08090202	08090202 08090202 08090202 08090202	08090202 08090202 08090203 08090203	08090203 08090203 08090203 08090203	

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3TAT2	022 022	022	022 022 022 022 022	022 022 022 022 022	022 022 022 022 022	022 022 022 022 022	022 022 022 022	
LONGITUDE	0894120 0893819 0894815	895448 895235 895235 895030 894500	894440 894040 894100 893715	0892100 0893510 0893309 0893100	0892724 0892235 0892000 0892000 0892000	0892000 0892000 0892000 0892000 0892300	0892300 0892300 0892300 0892300	
LATITUDE	301030 300928 3009410	300000 300000 295810 295630 295000 295415	295240 295124 295100 295125 294630	294400 294900 294731 294600 300654	294330 294110 293824 293824 293824	293824 293824 293824 293824 294030	294030 294030 294030 294130	
STATION NAME AND LOCATION	RIGOLETS, 2 MI E OF SAWMI RIGOLETS AT RABBIT IS OPF CHEF MENTEUR PASS O.75 MI	MR-GO AT BAYOU BIENVENUE (LA.) BAYDU BIENVENUE NR LAKE BORGNE MR-GO AT BAYOU VILLERE (LA.) MR-GO AT BAYOU DUPRE (LA.) BY TERRE AUX BOEUFS AT REGGIO LA MR-GO AT NAV LT 110, MILE 48.0	MR-GO AT FLAT BAYOU (LA.) MR-GO AT BAYOU YSCLOSKEY (LA.) BAYOU YSCLOSKEY NEAR MR-GO (LA) MR-GO AT NAV LT 103 MI. 38.2 LA. LAKE ELDI AT BAYOU ELDI %LA.<	BRETON SOUND NEAR DEADMAN POINT MR-GO AT NAV LT 102 MI. 35.4 LA. MR-GO AT NAV LT 101 MI. 32.5 LA. MR-GD AT NAV LT 99 MI. 29.8 LA. LK BORGNE 5 MI NW MALHEUREUX PT	MR-GO AT LK ATHANASIO MILE 25 MR-GO NR GARDNER IS MILE 20.0 MR-GO OPP TOWER STA 2620 MI 16.4 MR-GO 500 FT. NORTH OF MI. 16.4 MR-GO 500 FT. SOUTH OF MI. 16.4	MR-GO 800 FT. NORTH OF MI. 16.4 MR-GO 800 FT. SOUTH OF MI. 16.4 MR-GO 1000 FT. NORTH OF MI. 16.4 MR-GO 1000 FT. SOUTH OF MI. 16.4 MGO BRETON SND AT MILE 19.8	MR-GD 500 FEET NORTH OF MI. 19.8 3 MR-GD 500 FEET SOUTH OF MI. 19.8 3 MR-GD 1000 FEET NORTH OF MI 19.8 3 BRETON SDUND NE OF GARDNER IS	
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STATION NAME AND LOCATION	DYCE CREEK #1 DYCE CREEK #2 DYCE CREEK #3 TAYLOR CREEK #1 TAYLOR CREEK #2	TAYLOR CREEK #3 E FORK BLACKTAIL #1 E FORK BLACKTAIL #2 E FORK BLACKTAIL #3 BEAVERHEAD RIVER NEAR GRANT, MT.	BEAVERHEAD RIVER AT BARRETTS, MT. BEAVERHEAD RIVER NEAR TWIN BRIDGES, MT. RUBY RIVER NEAR TWIN BRIDGES, MT. MOOSE CREEK #1	CAMP CREEK #1 CAMP CREEK #2 BIG HOLE RIVER NEAR MELROSE, MT. WILLOW CREEK NEAR GLEN, MT. BIRCH CREEK NEAR GLEN, MT.	JEFFERSON RIVER NEAR TWIN BRIDGES, MT. JEFFERSON RIVER AT SILVER STAR, MT. BOULDER R NR CARDWELL MT LITTLE BOULDER R NR BOULDER MT BOULDER R NR BOULDER MT	FIREHOLE R AB DIV DAM NR OLD FAITHFUL YNP MADISON RIVER AT KIRBY RANCH NEAR CAMERON, M SAGE CREEK GALLATIN RIVER NEAR GALLATIN GATEWAY, MT.	MISSOURI RIVER AT TOSTON, MT. SIEBEN RCH DITCH BL CLARK C, NR L PRICKLY PEAR C AT SIEBEN R NR WOLF CREEK, L PRICKLY P C AB MED ROCK C, NR	
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STATION NAME AND LOCATION	MEDICINE ROCK CREEK NEAR WOLF CR LYONS CREEK NEAR WOLF CREEK, MT. L PRICKLY P C BL LYONS C, NR WOL WOLF CREEK AT WOLF CREEK, MT.		MARIAS RIVER NEAR SHELBY, MT. MARIAS RIVER NEAR LOMA, MT. SHEEP CREEK NEAR WOLF CREEK, MT. TETON RIVER NEAR DUTTON, MT. MISSOURI R AT VIRGELLE MONT	MISSOURI RIVER AT VIRGELLE, MT. E F BIG SPRINGS C BL RE E F BIG SPRINGS C AB BIG SPRINGS C MISSOURI RIVER @ FT PECK MISSOURI RIVER @ FT PECK	MISSOURI RIVER NEAR LANDUSKY, MT. TIMBER CREEK NEAR VAN NORMAN, MT. NELSON CREEK NEAR VAN NORMAN, MT. BIG DRY CREEK AT JORDAN, MT.	FLATWILLOW CREEK NEAR MOSBY, MT. YELLOWSTONE RIVER AT HUNTLEY, MT. MUSSELSHELL RIVER NEAR MOSBY, MT. MUSSELSHELL RIVER AT MOSBY, MT.	BEAVER C BL RE NR HAVRE MT MILK R AT NASHUA MONT WILLOW CREEK NEAR GLASGOW, MT. MILK RIVER AT NASHUA, MT.	
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LONGITUDE	1090332 1085831 1084650 1084804	1085201 1085403 1085035 1082812 1094800	1093400 1095000 1095400 1095900 1100000	1093900 1093300 1094533 1093754 1092757	1092434 1090035 1085340 1082614	1082232 1082539 1082229 1084900 1085600	1084200 1085130 1085130 1080927	
LATITUDE	450016 450932 451845 451954	452154 452258 452757 454748 433300	432500 434300 434000 434200	434000 434400 433443 433153 432716	432044 431433 431345 430202	430038 425716 425951 424400	424000 423600 423500 430853	
STATION NAME AND LOCATION	BIG SAND CL AT WY-MONT STATE LINE SILVER TIP CREEK NEAR BELFRY, MT. NORTH FORK BLUEWATER CREEK BRIDGER, MT. BLUEWATER CREEK NEAR BRIDGER, MT. BLUEWATER C AT SANFORD RANCH NR BRIDGER, MT.	BLUEWATER CREEK NEAR FROMBERG, MT. BLUEWATER CREEK AT FROMBERG, MT. CLARKS FORK YELLOWSTONE RIVER AT EDGAR, MT. YELLOWSTONE RIVER AT BILLINGS MT	WARM SPRINGS CK & UNION PASS RD DUNDIR CK BELOW FORKS & BRIDGE WEST FK LONG CK & LONG CK ROAD BROOKS LAKE CREEK & HIWAY 26-287 BROOKS LAKE NR OUTLET	HORSE CK & BRIDGE BEL CAMPGROUND WIGGINS FORK NR DOUBLE CABIN CG WIND RIVER NEAR DUBDIS, WYO. WIND RIVER AT DUBDIS WYO EAST FORK WIND RIVER NR DUBDIS WYO	EAST FORK WIND RIVER NR DUBDIS WYO DINWOODY CREEK ABOVE LAKES, NEAR BURRIS, WYO WIND RIVER NEAR CROWHEART, WYO. WYOMING CANAL NEAR LENDRE, WYO. LECLAIR CANAL NR RIVERTON	WIND R AT RIVERTON, WY BEAVER CREEK NR ARAPAHOE WYO LITTLE WIND R NR RIVERTON WYO MID.POPO AGIE R.® SINKS CG FTBRG ROARING FORK CK AB.WORTHEN RESVR	LIT.POPO AGIE R. BELOW CANYON LIT.POPO AGIE R. LOOP ROAD BRDG LOUIS CK & LOOP ROAD BRIDGE MUSKRAT CREEK NEAR SHOSHONI, WYO.	
HYDROLOGIC Unit CODE	10070006 10070006 10070006 10070006	10070006 10070006 10070007 10080001	10080001 10080001 10080001 10080001	10080001 10080001 10080001 10080001	10080001 10080001 10080001 10080001	10080001 10080002 10080003 10080003	10080003 10080003 10080004	

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BASIN DESCRIPTOR		024 014 014 024	88888 444444	000 - 000 - 00	000 424 000 44 014	0000 4 4 4 4	124 000 4 000 4 000	124	
DRAINAGE AREA		118.00 118.00 118.00		356.00	18.60	4.46 500.00 267.00 332.00	165.00 415.00 182.00 52.60	808.00	
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LONGITUDE		1084600 1084204 1084204 1084 150 1083700	1083000 1083408 1082800 1082700 1082500	1082500 1082500 1082400 1082354 1082300	1082100 1081850 1081500 1081306	1081200 1074702 1080817 1083608 1081630	108 1737 1074 144 1074316 1074610 1075445	1075835 1080446 1075750 1081208	
LATITUDE		431400 431804 431804 431756 431500	431300 431156 431300 431200	431200 431200 431200 431214 431200	431100 431138 431200 431320	431400 431037 431412 432146 431710	432105 431553 431722 431715 431652	431820 431609 435430 433846	
STATION NAME AND LOCATION	•	WYOMING CANAL BELOW PILOT DIVERSION NR MORTO FIVEMILE C AB WYO CA NR PAV WYO FIVEMILE C AB WYO CA NR PAV WYO FIVEMILE CREEK NR PAVILLION WYO POWERLINE WASTEWAY NR PAVILLION WYO	PAVILLION DRAIN NR PAVILLION WYD OCEAN DRAIN NR PAVILLION, WY OCEAN DRAIN NR PAVILLION WYD DUDLEY WASTEWAY NR PAVILLION WYD KELLETT DRAIN NR PAVILLION WYD	DEWEY DRAIN NR PAVILLION WYO FIVEMILE 76 DRAIN NR RIVERTON WYO SAND GULCH DRAIN AND WASTEWAY NR RIVERTON WY FIVE MILE CREEK NEAR RIVERTON, WYO LOST WELLS BUTTE DRAIN NR RIVERTON WYO	COLEMAN DRAIN NR SHOSHONI WYO SAND GULCH NR SHOSHONI WYO EAGLE DRAIN NR SHOSHONI WYO LATERAL P-34.9 WASTEWAY NR SHOSHONI WYO FIVEMILE CREEK NEAR SHOSHONI, WYO.	LATERAL P-36.8 WASTEWAY NR SHOSHONI WYD DEAD MAN GULCH NR MONETA WYD POISON CREEK NR SHOSHONI WYO MUDDY CREEK NEAR PAVILLION, WYO. MUDDY CREEK NEAR SHOSHONI, WYO.	COTTONWOOD CREEK NR BONNEVILLE WYO BADWATER CREEK NEAR LYSITE, WYO. BRIDGER CREEK NEAR LYSITE, WYO. DOLUS CR NR LYSITE WYO DOLUS CR NR LYSITE WYO	HOODOO CR NR BONNEVILLE WYO BADWATER CREEK AT BONNEVILLE, WYO. NOWATER CREEK NEAR COLTER WYOMING BIGHORN RIVER AT THERMOPOLIS, WYO.	
HYOROLOGIC Unit Cooe		10080005 10080005 10080005 10080005	10080005 10080005 10080005 10080005	10080005 10080005 10080005 10080005	10080005 10080005 10080005 10080005	10080005 10080005 10080005 10080005	10080005 10080006 10080006 10080006	10080006 10080006 10080007	

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BASIN DESCRIPTOR	004	014 004 014	004	004 014 014 024	004	0000 4 4 4 4	00 4 4 4	
DRAINAGE AREA	85.50 509.00	416.00 95.00 361.00	149.00 518.00 10810.00	11020.00 11048.00 96.90		57.90 803.00 72.00 1.59 2000.00	7.66	
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STATE	056 056 056 056 056	056 056 056 056 056	056 056 056 056 056	056 056 056 056 056	056 056 056 056 056	056 056 056 056 056	056 056 056 056	
LONGITUDE	1085202 1081100 1084030 1082800	1082336 1080910 1084525 1083112 1080348	1075546 1075928 1081343 1080042 1075808	1075808 1075559 1075500 1075900 1080150	1080202 1072000 1071300 1073100	1072320 1072539 1071740 1075430	1090600 1091100 1091839 1091752	
LATITUDE	433953 434300 434540 435540 435332	435214 435145 440000 440014 435522	435455 435826 440412 440114	440048 440330 441200 441600	442128 440500 441100 441737	435730 440048 440030 441633 441634	435600 435600 435210 435233	
STATION NAME AND LOCATION	S F DWL C NR ANCHOR WYD DWL CREEK NEAR LUCERNE, WYO. COTTONWOOD C AT COUNTY BR NR HAMILTON DOME W COTTONWOOD C AT ST HWY 120 NR HAMILTON DOME GRASS C AB L GRASS C NR GRASS CREEK WY	GRASS C NR MOUTH NR HAMILTON DOME WY COTTONWOOD CREEK AT WINCHESTER WYO GOOSEBERRY CREEK AT DICKIE, WYO. GOOSEBERRY C AT ST HWY 431 NR GRASS CREEK WY GOOSEBERRY CREEK AT NEIBER, WYO.	EAST FORK NOWATER CREEK NEAR COLTER, WYO. NOWATER C 4 MI SO OF WORLAND, WYO MIDDLE FORK FIFTEEN MILE CR NR WORLAND WYO FIFTEEN MILE CREEK NEAR WORLAND, WYO. BIGHORN R AT WORLAND WYO	BIGHORN R AT WORLAND WYO SLICK C 3.5 MILES NE OF WORLAND WY BIGHORN R NR MANDERSON WYO BIGHORN R AT MANDERSON WYO ELK CR NR BASIN WYO	ANTELOPE C 2 MILES S OF BASIN WY TENSLEEP CK AT FOREST BOUNDARY LAKE CK AT HIWAY 16 AB MEADOWLAR PAINTROCK CK AB HYATT RANCH MEDICINE LODGE CK AT USGS 2730	SPRING CR NR TEN SLEEP WYO NOWOOD R NR TENSLEEP, WY CANYON CREEK BELOW COOKS CANYON, NEAR TENSLE NOWOOD RIVER TRIB NO 2 NR MANDERSON WYO NOWOOD R AT MANDERSON, WYO	WOOD R.NEAR GUARD STA.AB BROWN C TH WOOD R AT BROWN MTN CG WOOD RIVER NEAR KIRWIN, WYO.	`~
HYDROLOGIC Unit Code	10080007 10080007 10080007 10080007	10080007 10080007 10080007 10080007	10080007 10080007 10080007 10080007	10080007 10080007 10080007 10080007	10080007 10080008 10080008 10080008	10080008 10080008 10080008 10080008	10080009 10080009 10080009	

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NIZAB Rotqiadzego	0 4 4 4 4 4	124	004 000 004		014 004 124	124 124 004	124	
DRAINAGE AREA	194.00 681.00 1115.00	433.00	145.00 560.00 15765.00 28.80		2350.00	381.00 2989.00 100.00 22885.00	428.00 1294.00	
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LONGITUDE	1085235 1081110 1090816 1090838	1090528 1090300 1074244 1075200 1080300	1074244 1080252 1081051 1081750 1095600	1094000 1094300 1093700 1093100 1093400	1093315 1085459 1085118 1082600 1082600	1082700 1081951 1085002 1080033 1072800	1072336 1073327 1072810 1072600	
LATITUDE	440215 440920 442424 435543 435608	435919 440155 443354 445000 443000	443354 443034 444531 445831 443000	442800 442700 442800 442800	441230 444023 444318 445020	445100 445131 444105 452840 460850	451038 454408 444702 444500	
STATION NAME AND LOCATION	WOOD RIVER AT SUNSHINE, WYO. GREYBULL RIVER AT MEETEETSE, WYO. GREYBULL RIVER NEAR BASIN, WYO. M F WOOD R NR KIRWIN WY	DICK C NR KIRWIN WY SUNSHINE RES TRIB NR MEETEETSE WY SHELL CK AT USGS 2785 NR SHELL PORCUPINE CK AT STAFF NR MOCNWHL DRY CREEK AT GREYBULL WYO	SHELL CREEK NEAR SHELL WYO SHELL C NR GREYBULL, WYO BIGHORN R AT KANE WYO BIG COULEE NEAR LOVELL, WYO. NORTH FORK SHOSHONE R AB PAHASKA	CLEARWATER CK & HIWAY 14-16-20 MOSS CK BELDW HOMES NR HIWAY ELK FORK CK & ELK FK CG NORTH FK SHOSHONE R & FOREST BDY CLOCKTOWER CK & HIWAY 14-16-20	SOUTH FK SHOSHONE R NR VALLEY SHOSHONE R BEL WILLWOOD DAM NR RALSTON WYO ALKALI C NR RALSTON WY SHOSHONE RIVER NEAR LOVELL WYO SHOSHONE RIVER NEAR LOVELL WYO		LITTLE BIGHORN R BL PASS CREEK, NR WYOLA, MT LITTLE BIGHORN RIVER NEAR HARDIN, MT. SOUTH TONGUE R AT USGS 2970 PRUNE CK AT STAFF AB SIBLEY LAKE	
HYDROLOGIC Unit Code	10080009 10080009 10080009 10080009	10080009 10080010 10080010 10080010	10080010 10080010 10080010 10080010	10080012 10080012 10080012 10080012	10080013 10080014 10080014 10080014	10080014 10080014 10080015 10080015	10080016 10080016 10090101 10090101	

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NIZAB Rotqiad230		004	124	004 004 014	000		014	
DRAINAGE AREA		37.80 18.00 392.00	33.60 358.00 1477.00 38.30 1770.00	31.30			2533.00	
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STATE	056 056 056		030 030 030 030	030	030 030 056 056 056	056 056 056 056 056	056 056 030 030	
LONGITUDE	107 1800 107 3200 107 105 1	107 1 100 107 1 401 107 0 2 49 107 0 1 49 106 5 7 40	1065536 1065015 1065008 1064209 1064615	1064252 1063555 1062529 1062708 1062435	1062751 1062832 1065918 1065847 1070110	1065753 1065625 1065430 1065813 1065633	1065513 1065021 1063128 1062725	
LATITUDE	445100 444700 444208	44304/ 444621 445432 445408 44925	450305 445905 450032 450319 450829	451228 451717 450007 450259 450409	450517 450750 445435 445441 445406	445426 445658 445758 44543 445638	445836 445902 452019 452443	
STATION NAME AND LOCATION	TONGUE R AT CAMPGROUND NR DAYTON NORTH TONGUE R NR BURGESS RS BIG GOOSE CK AT USGS GAGE 3020 LITTLE GOOSE CK AT USGS STA 3035	W FR BIG GOOSE CR AT USGS 3019 RAPID CK & STAFF AB B.GOOSE ROAD WOLF CREEK AT WOLF, WYO. SLATER CREEK NEAR MONARCH, WYO TONGUE RIVER AT MONARCH WYO GOOSE CREEK BELOW SHERIDAN WYO	SQUIRREL CREEK NR DECKER, MT. PRAIRIE DOG CREEK NEAR ACME, WYO. TONGUE RIVER AT STATE LINE NR DECKER MONT DEER CREEK NEAR DECKER, MT. TONGUE RIVER AT TONGUE R DAM, NEAR DECKER, M	FOURMILE CREEK NEAR BIRNEY, MT. BULL CREEK NEAR BIRNEY, MT. HANGING WOMAN C AT STATELINE NR OTTER MT WADDLE CREEK NEAR OTTER MT EAST TRAIL CREEK NEAR OTTER MT	CORRAL CREEK NR OTTER MT HORSE CREEK NR BIRNEY MT GOOSE C #1 GOOSE C #3 TONGUE R #1	TONGUE R #3 TONGUE R #3 TONGUE R #4 TONGUE R #5 TONGUE R #5	TONGUE R #7 ON YOUNGS C TONGUE R #8 ON PRAIRIE DOG C TONGUE RIVER BL HANGING WOMAN C., NR BIRNEY. TONGUE, P AT RIRNEY DAY SCHOOL BRIDGE NR BIRN	
HYDROLOGIC Unit Code	10090101 10090101 10090101	10090101 10090101 10090101 10090101	10090101 10090101 10090101 10090101	10090101 10090101 10090101 10090101	10090101 10090101 10090101 10090101	10090101 10090101 10090101 10090101	10090101 10090101 10090102 10090103	

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OW END RABY	1975		1970	1976	1952	1975 1951 1968 1975	1974	
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BASIN Rotqirds30		00	024 124 014	014	014 004	0 4 4 4 4 4 4		
DRAINAGE AREA	58.70	70.70 102.00 86.94	386.00 697.00 5379.00 450.00	980.00 3090.00 151.00 6050.00 36.80	1150.00 765.00	51.70 174.00 945.00 956.00		
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3TAT2	020 030 030		030 030 056 056	056 056 056 056 056	056 056 056 056 056	056 056 056 056 056	056 056 056 056	
LONGITUDE	1061220 1060925 1061139		1054010 1054124 1054824 1064829 1060400	1063148 1061750 1060620 1060800 1065555	1062033 1063436 1062204 1062030 1065600	1065600 1064647 1063940 1061025 1060900	1065555 1065242 1065611 1064610	
LATITUDE	451220 453046 453235	55409 60153 53220 54240 54600	455150 461342 462130 433851 442700	434135 434154 441250 443845 443450	434129 433710 433719 434102 441000	441200 441138 440450 442915 442900	443450 442722 443326 442000	
STATION NAME AND LOCATION	BEAR CREEK AT OTTER, MT. THREEMILE CREEK NEAR ASHLAND, MT. HOME CREEK NEAR ASHLAND MT BEAVER CREEK NEAR ASHLAND, MT.	LISCOM CREEK NEAR ASHLAND, MT. FOSTER CREEK NEAR VOLBORG, MT. PUMPKIN CREEK NEAR SONNETTE, MT. LITTLE PUMPKIN CREEK NEAR LOESCH, MT.	PUMPKIN CREEK NEAR VOLBORG, MT. PUMPKIN CREEK NEAR MILES CITY MT TONGUE RIVER AT MILES CITY, MT. M F POWDER R ABOVE KAYCEE, WYO. FORTIFICATION CREEK AT THE POWDER	POWDER RIVER NEAR KAYCEE, WYO. POWDER RIVER AT SUSSEX, WYO. DEAD HORSE CREEK NEAR BUFFALO, WYO. POWDER R AT ARVADA WYO NORTH PINEY CREEK NEAR STORY, WYOMING	POWDER R AB SALT CR NR SUSSEX WY SOUTH FORK POWDER R. NR. KAYCEE, WYO. SALT CREEK NEAR SUSSEX, WYO. SALT C 2MI W OF SUSSEX WY NORTH FK CRAZY WOMAN C STAFFGAGE	POLE CK BEL BIWAY 16 & STAFFGAGE N FK CRAZY WOMAN CR BL SPRING DR NR BUFFALO, N FK CRAZY WOMAN CR NR GREUB, WYO. CRAZY WOMAN CREEK AT UPPER STA, NEAR ARVADA, CRAZY WOMAN CREEK NEAR ARVADA, WYO.	NORTH PINEY CK AT USGS STA 3215 ROCK CK AT USGS GAGE 3200 NR BUF SOUTH PINEY CK AT USGS 3210 CLEAR CK AT USGS GAGE 3185	
HYDROLOGIC Unit Code	10090102 10090102 10090102	10090102 10090102 10090102 10090102	10090102 10090102 10090102 10090201	10090202 10090202 10090202 10090202	10090202 10090203 10090204 10090204	10090205 10090205 10090205 10090205	10090206 10090206 10090206 10090206	

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STATION NAME AND LOCATION	CLEAR CREEK NEAR BUFFALO, WYO. CLEAR C BL ROCK C NR BUFFALO WY CLEAR CREEK AT UCROSS WY PINEY CREEK AT KEARNY, WYO. SHELL CR AB LK DE SMET NR BUFFALO, WYO	PINEY CR AB LAKE DE SMET OUTLET NR BUFFALO. LK DESMET OUTFLOW TO PINEY C NR KEARNEY PINEY CR BEL LAKE DE SMET OUTLET NR BUFFALO. PINEY CR BL LAKE DE SMET OUTLET NR BUFFALO. PINEY CRL SENFF DRAW NR UCROSS WY	PINEY CREEK AT UCROSS WYO CLEAR CREEK NEAR ARVADA WYO PINEY C BL SENFF DRAW NR UCROSS WY POWDER RIVER AT MODRHEAD, MT.	LITTLE POWDER RIVER RAWHIDE CRK AT JCT WITH COTIONWD C RAWHIDE CREEK AT U S HIGHWAY 14-16, NR GILLE L POWDER RIVER AB COTTONWOOD CREEK NEAR WEST COTTONWOOD C NR WESTON WY	L POWDER R NR WESTON WY L POWDER RIVER AB DRY C NR WESTON, WY POWDER RIVER NEAR LOCATE, MT. LOCATE CREEK NEAR ISMAY MT MIZPAH CREEK AT OLIVE, MT.	MIZPAH CREEK NEAR VOLBORG, MT. MIZPAH CREEK NEAR MIZPAH, MT. WILLOW CREEK AT THE POWDER RIVER WILLOW CR AT THE POWDER RIVER YELLOWSTONE RIVER AT MYERS, MT.	WEST FORK ARMELLS CREEK NEAR FORSYTH, MT. YELLOWSTONE RIVER AT FORSYTH, MT. YELLOWSTONE RIVER NEAR MILES CITY, MT. ROSEBUD C AT RESERVATION BOUNDARY NR KIRBY M
HYDROLOGIC Unit Code	10090206 10090206 10090206 10090206	10090206 10090206 10090206 10090206	10090206 10090206 10090206 10090207	10090208 10090208 10090208 10090208	10090208 10090209 10090209 10090209	10090210 10090210 10090902 10090902	10100001

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STATION NAME AND LOCATION	ROSEBUD CREEK NEAR COLSTRIP, MT. GREENLEAF CREEK NEAR COLSTRIP, MT. COW CREEK NEAR COLSTRIP MT ROSEBUD CREEK AT MOUTH, NEAR ROSEBUD, MT. YELLOWSTONE RIVER NEAR TERRY, MT.	CHERRY CREEK NEAR TERRY MT BURNS CREEK NEAR SAVAGE, MT. YELLOWSTONE RIVER NEAR SIDNEY, MT. MISSOURI RIVER NR WILLISTON, ND BEAR DEN CREEK NR MANDAREE, ND	LITTLE MISSOURI RIVER AT ALZADA MT N FORK LITTLE MISSOURI RIVER LITTLE MISSOURI RIVER AT ALZADA, MT. LITTLE MISSOURI RIVER AT MARMARTH, ND LITTLE MISSOURI RIVER AT MEDORA, ND	LITTLE MISSOURI R NEAR WATFORD LITTLE MISSOURI RIVER NR WATFORD CITY, ND DONKEY CREEK NEAR ROZET PORCUPINE CR AT HILIGHT RD UPPER ANTELOPE CR	BEAR CREEK ANTELOPE CR AT IRWIN RD PORCUPINE C AB BOSS C NR TECKLA DRY FORK CHEYENNE RIVER AT FIDDLEBACK CROSSING	DRY FORK CHEYENNE RIVER NEAR BILL, WYO DRY FORK CHEYENNE R NR ORPHA WY UPPER LITTLE THUNDER CREEK LOWER LITTLE THUNDER CREEK SCHOOL CR AT STOCK WATER RES	CHEVENNE RIVER NR DULL CENTER WY LANCE CREEK NR RIVERVIEW WY BOX CREEK AT HIGHWAY 59 SAGE CREEK
HYDROLOGIC UNIT CODE	10100003 10100003 10100003 10100003	10100004 10100004 10110101 10110101	10110201 10110201 10110203 10110203	10110205 10110205 10120001 10120101	10120101 10120101 10120101 10120102	10120102 10120102 10120103 10120103	10120103 10120104 10120105 10120105

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STATION NAME AND LOCATION	BOX C BL CONFLUENCE NR BILL WY	CHEYENNE RIVER NEAR EDGEMONT SD CHEYENNE RIVER NR RIVERVIEW WY CHEYENNE R NEAR HOT SPRINGS SD	BEAVER CREEK NEAR NEWCASTLE, WYD. HAT CR NEAR EDGEMONT SD CHEYENNE R BELOW ANGOSTURA DAM SD CASTLE CR ABOVE DEERFIELD RES NEAR HILL CITY CHEYENNE R NEAR PLAINVIEW SD	CHEYENNE R AT CHERRY CREEK SD RAVEN CREEK AT BELLE FOURCHE RIVER CABALLO CREEK AT BELLE FOURCHE R BELLE FOURCHE R BL RATTLESNAKE C NR PINEY WY	DONKEY C NR MODRCROFT WY BELLE FOURCHE RIVER BELOW MODRCROFT, WYO. DONKEY C O.4MI AB LEE DRAW AB WYODAK MINE WY DONKEY CR BL WYODAK MINE NR GILLETTE WY DONKEY C O.5MI BL LEE DRAW AB WYODAK MINE WY	INDIAN CR NEAR ARPAN SD HORSE CR NEAR VALE SD BELLE FOURCHE R NEAR STURGIS SD BELLE FOURCHE R NEAR ELM SPRINGS SD REDWATER CR AT WY-SD STATE LINE	WHITEWOOD C NR VALE SD INDIAN C NR NEWELL SD BELLE FOURCHE R NR HEREFORD SD MISSOURI R AT BISMARCK ND MISSOURI RIVER AT GARRISON DAM	MISSOURI RIVER AT GARRISON DAM. ND MISSOURI RIVER AT BISMARCK. ND MISSOURI RIVER NR SCHMIDT. ND GRAMD B. MEAB WAKPALA SD	
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DRAINAGE AREA	5223.00	1230.00 549.00 2240.00 1240.00	1710.00 3310.00 580.00 1140.00	4100.00 509.00 1190.00	1350.00 3120.00 5370.00	2660.00 4880.00 243500.00 3107.00	1500.00 2200.00 3000.00 5000.00	
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STATION NAME AND LOCATION	MOREAU R AT CHEYENNE RI CHEYENNE RI	MISSOURI R AT OAHE DAM SD KNIFE R AT HAZEN N D KNIFE RIVER NR GOLDEN VALLEY, ND SPRING CREEK AT ZAP, ND KNIFE RIVER AT HAZEN, ND HEART RIVER NR RICHARDTON, ND HEART R NEAR MANDAN, NO DAKOTA	HEART R BELOW HEART BUTTE DAM NR GLEN ULLIN HEART RIVER NR MANDAN, ND CANNONBALL RIVER AT REGENT, ND CANNONBALL RIVER BELOW BENTLEY, ND CEDAR CREEK NR PRETTY ROCK, ND	CANNONBALL RIVER NEAR BREIEN CANNONBALL RIVER AT BREIEN, ND NF GRAND R NR HALEY N D NORTH FORK GRAND RIVER AT HALEY, ND NORTH FORK GRAND RIVER AT HALEY, ND	SOUTH FORK GRAND R NEAR CASH SD GRAND R NEAR LITTLE EAGLE GRAND R AT SHADEHILL SD GRAND R AT LITTLE EAGLE SD MOREAU RIVER NEAR WHITEHORSE SD	MOREAU R NEAR FAITH SD MOREAU R NEAR WHITEHORSE SD BAD RIVER NEAR FT PIERRE MISSOURI R AT PIERRE SD BAD R NEAR FORT PIERRE SD	WHITE R AT SLIM BUTTE SD WHITE R NEAR OGLALA SD WHITE R NEAR ROCKYFORD SD WHITE R NEAR KADOKA SD	
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STATION NAME AND LOCATION		LITTLE WHITE R BELOW WHITE RIVER SD 4 WHITE RIVER AT ST HWY 47	KEYA PAHA RIVER AT I	MIOBRARA RIVER NR HAY SPRINGS, NEBR. MIOBRARA RIVER NEAR GORDON, NEBR. MIOBRARA RAT CODY NEBR MIOBRARA RIVER NEAR SPARKS, NEBR.	MIDBRARA R NR MEADVILLE NE 1 LONG PINE CREEK NEAR RIVERVIEW, NEBR. 5 SNAKE RIVER NEAR BURGE, NEBR. 5 KEYA PAHA R NEAR HIDDEN TIMBER SD 8 KEYA PAHA R AT WEWELA SD	PISHELVILLE BRIDGE NEAR VERDEL 7 NIOBRARA RIVER NR. VERDEL, NEBR. 7 VERDIGRE C NR VERDIGRE NE 8 JAMES RIVER AT LAMOURE, ND 9 JAMES R AT COLUMBIA SD	SOUTH FORK SNAKE CR NEAR ATHOL SD JAMES R NEAR SCOTLAND SD POWERHOUSE OUTFLOW GAVINS PT DAM MISSOURI R AT YANKTON S D MISSOURI R AT FORT RANDALL SD	MISSOURI R AT YANKTON SD MISSOURI RIVER NEAR PONCA, NEBRASKA 2 VERMILLION R NR CHANCELLOR S DAK 2 VERMILLION R NEAR WAKONDA SD 2 VERMILLION R AT VERMILLION, S.D.	BIG SIOUX R NEAR WATERTOWN SD BIG SIOUX R AT WATERTOWN SD WILLOW CR NEAR WATERTOWN SD STRAY HORSE CR NEAR CASTLEWOOD SD	
HYDROLOGIC Unit Code		10140203	10150001	10150003 10150003 10150004 10150004	10150004 10150004 10150005 10150006	10150007 10150007 10150007 10160003	10160008 10160011 10170101 10170101	10170101 10170101 10170102 10170102	10170202 10170202 10170202	

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HIDEWOOD CR NEAR ESTELLINE SD SIXMILE CR NR BROOKINGS SD BIG SIOUX RIVER 114MS1W300D BIG SIOUX RIVER 114MS1W300D BIG SIOUX RIVER PROOKINGS SD BIG SIOUX RALES SD BIG SIOUX RALES SD BIG SIOUX RAT STORING SO BIG SIOUX RAT SO BIG	LATITUDE	44440	33201 33625 33659 24942 31158	403100 402400 404400 402936 403123	403327 403424 403457 404143 402829	405610 403425 403657 405447 411540		7 4 6 6	
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LONGITUDE	1062640	1063000 1063110 1063240	1065250 1065240 1064710 1062710 1064910	1064540 1064530 1064750 1064750	1065700 1065700 1065840 1065810	1070630 1064450 1064100 1064320 1064340	1064850 1064850 1064830 1064535	1064927 1065917 1070325	
LATITUDE	11940	12040	410200 410940 410740 412910 410100	410120 410120 410030 410030	411000 411000 410900 411820	411550 405950 405940 405930 405950	405930 410000 405920 410128	410125 413453 415220	
STATION NAME AND LOCATION			HOG PARK RESERVOIR N FORK ENCAM BL BOTTLE CR ENCAMPMENT RIVER WATER VALLEY PASS CREEK EAST FORK WIER	UPPER EAST FORK STREAM GAUGE COON CREEK STREAM GAUGE RYAN CR AT CONF WITH EAST FORK EAST FORK ENCAMP BELOW RYAN CR MAIN ENCAMP BELOW EAST FORK	NELLIE CR ABOVE COW CR LOWER HIDDEN TREASURE GULCH NELLIE CR BELOW BATTLE TOWN SITE HIDDEN TREASURE GULCH AB HW 70 JACK CR BL JACK CR PARK	JACK CR AB JACK CR GUARD STATION DAMFINO CREEK STREAM GAUGE DAMFINO CREEK AT HEADWATERS TRIBUTARY TO DAMFINO CR %UPPER<	RYAN CREEK AT HEADWATERS AT HOG PARK GUARD STATION WEST FORK ENCAMP AT JEEP TRAIL COON CREEK STREAM GAGE UPPER EF ENCAMPMENT RIVER	HDG PARK GUARD STATION ENCAMPMENT RIV AB HOG PARK CR NR ENCAMPMENT SAGE CREEK NEAR SARATOGA, WYD N PLATTE R AB SEMINOE RES NR SINCLAIR WYO	
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3TAT2		008 056 056 056	056 056 056 056	056 056 056 056	056 056 056 056	056 056 056 056	056 056 056 056	056 056 056 056	
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LON		1063406 1064840 1064801 1064806 1062319	1061349 1063030 1063045 1060938 1085256	1084626 1084452 1084446 1075145	1081857 1081450 1054400 1063000	1063600 1064131 1063609 1063210 1061909	1061253 1054530 1054209 1062000	1063600 1062500 1062732 1062600	
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LATITUDE		05750 10110 15607 15644 13127	413445 420022 420035 415712 422230	3259 3057 3047 22056	121848 121940 125100 130100 124900	24100 23427 24034 24315 25126	125140 125010 130245 123200	4000 3700 3231 3800	
LAT		4444		44444	4444	44444	44 44	4444	
STATION NAME AND LOCATION		S.F. BIG CR NR PEARL LOWER EF ENCAMPMENT RIVER BIG DITCH NR COYOTE SPRINGS WY NORTH DITCH NR COYOTE SPRINGS WY MEDICINE BOW RIVER	ROCK CREEK HANNA DRAW NR HANNA WY MEDICINE BOW RIVER ABOVE SEMINOE RESERVOIR N L MEDICINE BOW R NR MEDICINE BOW WYO SWEETWATER RIVER NEAR SOUTH PASS CITY, WYOMI	ROCK CREEK ABOVE ROCK CREEK RESERVOIR, WYO. SLATE CREEK NEAR ATLANTIC CITY, WYO. ROCK CREEK AT ATLANTIC CITY, WYO. W F CROOKS CREEK NEAR JEFREY CITY, WY SWEETWATER RIVER NEAR ALCOVA, WYO.	SOUTH FORK SULFUR C SITE M WEST ALKALI C NR SWEETWATER STAT SAND CREEK AT THE N PLATTE RIVER CASPER CREEK NR ILLCD POISON SPIDER CREEK AT N PLATTE R	BATES CREEK AT THE N PLATTE R NORTH PLATTE R AT ALCOVA WYO BATES C NR ALCOVA WYO N PLATT R NR GOOSE EGG WYO NORTH PLATTE R AT CASPER WYO	NORTH PLATTE RIVER BL CASPER WYO N PLATTE R NR GLENROCK WYO SAND C NR CLAYTON WY FRANK DRAW TRIB NO 1 NR DRPHA WY BATES CREEK	BATES CREEK @ 220 BRIDGE BATES CREEK @ 220 BRIDGE STINKING CREEK @ STOCK TRAIL BIG RED	
HYDROLOGIC Unit Code		10180002 10180002 10180003 10180003	10180004 10180004 10180005 10180005	10180006 10180006 10180006 10180006	10180006 10180006 10180007 10180007	10180007 10180007 10180007 10180007	10180007 10180007 10180007 10180007	10180007 10180007 10180007	

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OW END YEAR	1976 1976 1975	1975	1965 1965 1965 1965	1965 1965 1962 1962	1976 1976	1976	1970 1959 1959	
XEAR OW REGIN	1975 1975 1966 1966	1969 1969 1964 1964	1961 1961 1961 1961	1961 1961 1961 1969	1976 1976 1975 1975	1975 1975 1975 1975	1968 1974 1958 1958	
MISA8 ROT41A3230	124	124 124 124	024 024 024 024	024 024 024 124			124 014 004 004	
DRAINAGE AREA	14379.00 14888.00 15837.00	16237.00 25095.00 22218.00		26700.00			1071.00	
TYPE OF	8 8 8 8 8 8 8 8 8	AS SA S	MS MS	N N N N N N N N N N N N N N N N N N N	MS M	MS MS	AS S AS	
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LONGITUDE	1062500 1082800 1052326 1050946	1044515 1042102 1042102 1040257 1040248	1035033 1035000 1033500 1033726 1034057	1033000 1032600 1032008 1031856 1023800	1060130 1060230 1061700 1061420	1060950 1060910 1061100 1061050	1053627 1053656 1051114 1050400	
LATITUDE	423800 423900 424100 423902	421650 420613 420613 415925 415927	415230 420000 415400 415413 414654	415200 415300 415018 415003 413000	4 10 820 4 10 100 4 12 120 4 12 135	412010 411910 412030 412030	411936 412450 415308 420228	
STATION NAME AND LOCATION	CORRAL CREEK LITTLE RED CREEK NORTH PLATTE RIVER NR DOUGLAS WYO NORTH PLATTE R. AT ORIN, WYO. NORTH PLATTE RIVER NR CASSA WYO	NORTH PLATTE R BL GUERNSEY RE, WYO NORTH PLATTE RIVER NEAR LINGLE, WYO. NORTH PLATTE RIVER NEAR LINGLE, WYO. N PLATTE R AT WYO-NEBR STATE LINE N PLATTE R AT WYO-NEBR STATE LINE	BROWN CANYON DR NR MITCHELL NEBR DUTCH FLATS DR NR MITCHELL NEBR WINTER CREEK AT TRISTATE CA NR SCOTTSBLUFF,N HALE DRAIN NR SCOTTSBLUFF NEBR GERING DR AT MITCHELL-GERING CAN NR GERING N	ALLIANCE DR NR MINATARE NEBR NINEMILE DRAIN NR MINATARE NEBR WEST WILDHORSE DR NR BAYARD NEBR WILDHORSE DR NR BAYARD, NEBR. NORTH PLATTE RIVER AT LISCO, NEBR.	FOX CREEK BOSWELL CREEK LIBBY CR ABOVE HW 130 TELEPHONE CR ABOVE HW 130 NASH FORK ABOVE HW 130	N FORK LITTLE LARAMIE R AB HW13O LIBBY CR AT FOREST BOUNDRY NASH FORK AB MED BOW SKI AREA NASH FORK BL MED BOW SKI AREA SOUTH FORK LITTLE LARAMIE RIVER	LARAMIE RIVER AT LARAMIE, WYD. LARAMIE RIVER AT HOWELL, WY WHEATLAND CA NO 1 NR WHEATLAND WYO WHEATLAND CA 2 NR WHEATLAND WYO	
HYDROLOGIC Unit Code	10180007 10180007 10180008 10180008	10180008 10180009 10180009 10180009	10180009 10180009 10180009 10180009	10180009 10180009 10180009 10180009	10180010 10180010 10180010 10180010	10180010 10180010 10180010 10180010	10180010 10180010 10180011	

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BASIN DESCRIPTOR	124	124 004 024 124 124	124 124 024 024	124	004 004 024	024		
DRAINAGE AREA	4440.00		2.10 9598.00 13245.00 212.00 52.00 72.00	424.00 137.00 1055.00	28.60 35.90 111.00	23138.00		
77PF 0F 3T12	MS MS	*** **********************************		N N N N N	M M M M M M M M M M M M M M M M M M M	N N N N N N N N N N N N N N N N N N N	N M M M	
COUNTY	031	015 157 093 059 059 005	123 123 087 013 013	123 069 061 001	001 001 039 039	001 001 115 131 047	047 047 047 047	
3TAT2			8 8 8 8 8	008 008 056 056	056 056 008 008 008	056 056 008 031 031	031 031 031	
LONGITUDE	1044633	1041211 1040000 1054305 1051031 105101 1050107	1051105 1043346 1035517 1051534 1051812	1050053 1053048 1051326 1052500 1052320	1052210 1051920 1043200 1043216 1042830	1052420 1052600 1021515 0990000 1000923	1000930 1000933 0993224 0993223	
LATITUBE	420816 421202	414035 415500 391742 392432 392433 393708	x 4 6 6 8 6	400929 402242 403952 411300	411120 411130 391235 391238 392014	411500 411510 405846 404055	405425 405420 404057 404048	
STATION NAME AND LOCATION	E WYD	NCH NEAR LA GRANGE SON, CO. OUTH PLATTE, CO. LETON, CO. SEWER AT DENVER, C	WOMMAN CREEK AI RUCKY FLAIS PLANI, CU. SOUTH PLATTE RIVER NEAR WELDONA, CO. SOUTH PLATTE RIVER NEAR WELDONA, CO. ST. VRAIN CREEK AT LYONS, CD. LEFT HAND CREEK NEAR BOULDER, CO. LEFT HAND CREEK AT MOUTH, AT LONGMONT, CD.	ST. VRAIN CREEK BELOW LONGMONT, CO. BIG THOMPSON RIVER AT ESTES PARK, CO. CACHE LA POUDRE R A MO OF CN, NR FT COLLINS, 1 MILE ABOVE WALLIS PG BELOW BLAIR PG	RES OUTLET AT VEDAUWOD CG AT FOREST RD ND 700 KIDWA CREEK AT ELBERT, CO. WEST KIDWA CREEK AT ELBERT, CO. KIOWA CREEK AT KIOWA, CO.	LODGEPOLE CR AT POLE CR CAMPGR LODGEPOLE CR AT UPPER TIE CITY SOUTH PLATTE RIVER AT JULESBURG, CO. MISSOURI R AT NEBR CITY NE PLATTE R. AT GOTHENBURG, NEBR. (NORTH CHAN.)	PLATTE R. AT GOTHENBURG, NEBR. (MIDDLE CHAN.) PLATTE R. AT GOTHENBURG, NEBR. (SOUTH CHAN.) PLATTE R NR OVERTON N CHAN PLATTE R NR OVERTON S CHAN	·
HYDROLOGIC Unit Code			10190003 10190003 10190005 10190005	10190005 10190006 10190007 10190009	10190009 10190009 10190010 10190010	10190015 10190015 10190018 10200101	10200101 10200101 10200101	

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NEGIN RA3Y	1950 1946 1	1966 1948 1971 1952 1960	1970 1973 1975 1964	1951 1970 1970 1947 1966	1948 1958 1943 1946	1949 1 1946 1971 1975	946 1 956 1 957 1	
BASIN DESCRIPTOR	124	124	000	00000 444444	124	024	000 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	
DRAINAGE AREA	57700.00 379.00 60900.00	270.00	85800.00	684.00 119.00 1051.00 1850.00	2040.00 41.90 8090.00	3750.00 4290.00 14400.00	762.00 1060.00 1220.00	
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3TAT2	031 031 031	03 03	031 031 031	031 031 031	031 031 031	031 031 031	031	
LONGITHDE	0993224 0991148 0972941	0,000000	0960928 0960715 0955746 0962703	0964054 0963239 0962701 1000600 1003130	1000605 0985204 0982650 0982650 0984425	0985517 0982650 0974920 0974325 0980450	0982648 0980453 0980015 0983030	
LATITUDE	404057 404756 412204	124 131 100 100 100 100	410055 410005 410102 405803	405049 410056 405756 414950 414645	414923 411736 411155 411155 410153	411535 4112331 412505 414550	414241 412826 412345 422342	
STATION NAME AND LOCATION	PLATTE RIVER NEAR OVERTON, NEBR. (TOTFLO) WOOD RIVER NEAR RIVERDALE, NEBR. S PLATTE RIVER NEAR DOUNCAN, NEBR.	PLATTE RIVER NR. SCHUYLER, SHELL CREEK NEAR COLUMBUS, PLATTE RIVER AT NORTH BEND, PLATTE R NR LOUISVILLE NE PLATTE RIVER NEAR SOUTH BEN MILL CREEK AT LOUISVILLE NE	PLATTE R AT LOUISVILLE NE CEDAR CREEK NEAR LOUISVILLE NEBR FOURMILE CREEK NEAR PLATTSMOUTH, NEBR. SALT C AT GREENWOOD NE OAK C NR RAYMOND NEBR	SALT CREEK AT LINCOLN, NEBR. ROCK CREEK NEAR CERESCO, NEBR. SALT CREEK AT GREENWOOD, NEBR. MIDDLE LOUP RIVER AT DUNNING, NEBR. DISMAL RIVER NR THEDFORD NEBR	DISMAL RIVER AT DUNNING, NEBR. OAK CREEK NEAR LOUP CITY, NEBR. MIDDLE LOUP R. AT ST. PAUL, NEBR. UNKNOWN STATION SOUTH LOUP R AT ST. MICHAEL, NEBR.	NORTH LOUP RIVER AT ORD, NEBR. 7 NORTH LOUP RIVER NR ST PAUL NEBR 9 LOUP R POWER CA AT DIV NR GENDA, NEBR. 1 LOUP RIVER NEAR GENDA, NEBR. 9 BEAVER CR AT LORETTO NEBR	CEDAR RIVER NEAR SPALDING, NEBR. CEDAR R AT BELGRADE NEBR CEDAR RIVER NEAR FULLERTON, NEBR.	
HYDROLOGIC Unit Code	10200101 10200102 10200103	10200201 10200201 10200202 10200202 10200202	10200202 10200202 10200202 10200203	10200203 10200203 10200203 102 10001 102 10002	102 10002 102 10003 102 10003 102 10003	10210007 10210007 10210009 10210009	102 100 10 102 100 10 102 100 10 102 2000 1	

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GN3 WO RA3Y	1979	1968 1978 1968	1975 1969 1973 1973	1967 1969 1969	1967 1973 1969	1969	1973	
KEVB OM BECIN	1948 1960 1962	1963 1960 1965 1948 1948	1967 1968 1968 1950	1957 1939 1963 1965	1965 1965 1956 1939	1962 1970 1969 1968	1968 1945 1962 1973	
BASIN DESCRIPTOR	000 4 000 4 000 4		00 00 00 00 00 00 00 00 00 00 00 00 00			004	888 444	
DRAINAGE AREA	1400.00 320.00 210.00	2790.00 700.00 6900.00 731.00	1334.00 2500.00 2730.00			9.26 129.00 322800.00	871.00 6.97 80.10	
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LDNGITUDE	0982011 0982011 0982018	0974400 0972840 0972904 0972415 0961705	0961843 0955820 0950234 0954749	0960441 0960245 0955930 0955100	0960243 0960615 0955009 0955520	0955615 0955327 0955520 0955520	0952003 0954657 0954820 0960710	
LATITUDE	421603 421603 420820	20245 20020 21044 20159 11725 20640	423436 415755 430106 422820 420456	421534 421557 415755 420400 411003	411840 411822 411713 411530 411600	414510 413754 411532 411532 420540	420033 413833 414420 405118	
STATION NAME AND LOCATION	ELKHORN RIVER AT EWING, NE SOUTH FORK ELKHORN RIVER A CLEARWATER C NR CLEARWATER		FLOYD RIVER AT JAMES, IOWA L SIDUX R NR TURIN IOWA LITTLE SIDUX RIVER NEAR GILLETT GROVE, IOWA LITTLE SIDUX RIVER AT CORRECTIONVILLE, IOWA LITTLE SIDUX RIVER AT KENNEBEC, IOWA	WF DITCH NR HOLLY SPRINGS IOWA WOLF C NR HOLLY SPRINGS IOWA MONONA HARRISON D NR TURIN IOWA GINGLES WATCRSHEDS WB PAPILLION NR PAPILLION NEBR	L PAPILLION C AT IRVINGTON NEBR BIG PAPILLION C AT FORT ST OMAHA INDIAN C N BROWY COUNCIL BLUFFS IA MISSOURI R AT OMAHA NE L PAPILLION C A PEONY PARK OMAHA NE	STEER CREEK NEAR MAGNOLIA, IA. WILLOW CREEK NEAR LOGAN, IOWA MISSOURI RIVER AT OMAHA, NEBRASKA BOYER RIVER AT DELOIT IA	E F BOYER RIVER NR DENISON IA BOYER RIVER AT LOGAN, IOWA THOMPSON CREEK AT WOODBINE, IA. WEEPING WATER CR AT WEEPING WATER, NEBR.	,
HYDROLOGIC Unit Code	10220001 10220001 10220001	10220001 10220001 10220002 10220003 10220003	10230002 10230003 10230003 10230003	10230004 10230004 10230004 10230005 10230006	10230006 10230006 10230006 10230006	10230006 10230006 10230006 10230006	10230007 10230007 10230007 10240001	

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DRAINAGE AREA	241.00	1326.00 10.60 26.00 894.00 2806.00	49.30 11.90 29.00 3.74	160.00 220.00 218.00 .19	276.00	57.00 111.00 762.00	217.00	
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LONGITUDE	0955643 0955440 0955417 0955048	0953448 0953542 0944820 0951407	0953732 0950632 0953350 0953136 0952702	0951916 0951130 0961046 0960731	0960630 0953530 0954035 0953820 0953920	0953535 0953731 0953310 0950047 0950520	0942446 0945128 0945128 0943330	
LATITUDE	404845 404735 404746 404055	405223 405636 414025 410041 403757	403757 405852 394857 394734 394516	394653 394920 403758 404016 404021	395652 400200 395036 395017 395200	395358 395252 395820 404419 402640	404602 394510 394512 392400	
STATION NAME AND LOCATION	S BR WEEPING WATER CREEK NEAR UNION NEBR WEEPING WATER CREEK AT UNION, NEBR. WEEPING WATER C NR UNION, NEBR. MISSOURI RIVER AT NEBRASKA CITY, NEBR.	WEST NISHNABOTNA RIVER AT RANDOLPH, IOWA MULE C NR MALVERN IA DAVIDS CREEK NEAR HAMLIN, IOWA EAST NISHNABOTNA RIVER NEAR RED OAK, IOWA NISHNABOTNA RIVER ABOVE HAMBURG, IOWA	5 TARKIO RIVER AT STANTON, IOWA 5 WOLF R 3 MILES SW OF HIAWATHA, KS 5 WOLF R AT HIAWATHA, KS 5 BUTTERMILK C NR WILLIS, KS	WOLF R P WOLF R P LITTLE P BROWNELL BROWNELL	TURKEY C NR SENECA, KS NEMAHA R FALLS CITY NEB SPRING C NR FAIRVIEW, KS WALNUT C NR FAIRVIEW, KS MULBERRY C NR FAIRVIEW, KS	WALNUT C NR HAMLIN, KS B TERRAPIN C AT HAMLIN, KS WALNUT C AT RESERVE, KS NODAWAY RIVER AT CLARINDA, IDWA D BURLINGTON JUNCTION NODAWAY R	PLATTE RIVER NEAR DIAGONAL, IOWA MISSOURI R ST JUSEPH MO MISSOURI RIVER AT ST. JUSEPH, MO. 2 L PLATTE R SMITHVILLE MAIN STREET M	
HYDROLOGIC Unit Code	10240001 10240001 10240001 10240001	10240001 10240002 10240003 10240003	10240004 10240005 10240005 10240005	10240005 10240005 10240006 10240006	10240007 10240008 10240008 10240008	10240008 10240008 10240009 10240010	10240010 10240011 10240011 10240012	

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3TAT2		031 008 020 031	031 031 031 031	031 031 031 031	031 031 031 031	031 031 031 031	020 020 020 031 031	020 020 031 020	
LONGITUBE	0	1013230 1021706 1020040 1011342	1010240 1000835 1013055 1013035	1010740 1005240 1010650 1003000	1003747 1002640 1001920 1001525 1001320	1001035 0992950 1000835 0993008	1013757 1004318 1003428 0995324 0993315	1005740 1003335 0995335 1000600	
LATITUDE	100	400425 400425 393410 400828	401000 401705 402505 402505	402050 401405 402210 401410 403920	403751 403833 403010 402820 402220	401755 400750 401705 400753 391707	391914 394037 394707 400245	395055 395906 400712 394613	
STATION NAME AND LOCATION	CONTRACT TA CONTRACT TO CONTRA	S.F. REPUBLICAN R NR BENKELMAN NEB NORTH FORK REPUBLICAN RIVER NEAR WRAY, CO. SF REPUBLICAN R NR CO-KS ST LINE, KS REPUBLICAN RIVER AT STRATTON, NEBR.	REPUBLICAN RIVER AT TRENTON, NEBR. REPUBLICAN RIVER AT CAMBRIDGE, NEBR. ENDERS RESERVOIR NEAR ENDERS, NEBR. FRENCHMAN CREEK NEAR ENDERS, NEBR.	FRENCHMAN CREEK AT PALISADE, NEBR. FRENCHMAN CREEK AT CULBERTSON, NEBR. STINKING WATER CREEK NEAR PALISADE, NEBR. RED WILLOW CREEK NEAR RED WILLOW, NEBR. MEDICINE CREEK AT MAYWOOD, NEBR.	BRUSHY CREEK NEAR MAYWOOD, NEBR. DRY CREEK NEAR CURTIS, NEBR. MEDICINE CREEK ABOVE HARRY STRUNK LAKE, NEBR MITCHELL CREEK ABOVE HARRY STRUNK LAKE, NEBR MEDICINE CREEK BELOW HARRY STRUNK LAKE, NEBR	MEDICINE CREEK AT CAMBRIDGE, NEBR. REPUBLICAN R NR ORLEANS NEB REPUBLICAN R NR CAMBRIDGE NEB REPUBLICAN RIVER NEAR ORLEANS, NEBR. SF SAPPA C NR BREWSTER, KS	SF SAPPA C TR NR GOODLAND, KS SF SAPPA C NR ACHILLES, KS SAPPA C NR OBERLIN, KS SAPPA CREEK NEAR BEAVER CITY, NEBR. SAPPA CREEK NEAR STAMFORD, NEBR.	BEAVER C AT LUDELL, KS BEAVER C AT CEDAR BLUFFS, KS BEAVER CREEK NEAR BEAVER CITY, NEBR. PRAIRIE DOG C AB NORTON RE, KS	
HYDROLOGIC Unit Code	**************************************	10250002 10250003 10250003	10250004 10250004 10250005 10250005	10250005 10250005 10250006 10250007 10250008	10250008 10250008 10250008 10250008	10250008 10250009 10250009 10250009	10250010 10250010 10250011 10250011	10250014 10250014 10250014 10250015	

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OW END YEAR	1975 1968 1968 1979	1976 1968 1971	1979	1968 1967 1970	1974 1975 1968	1969 1976 1958	1978 1973 1978	
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BASIN DESCRIPTUR	014 004 014	014	00 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	00 00	00 00 00 00 00 00 00 00 00 00 00 00 00	000 410 410	0000 4 4 4 4	
DRAINAGE AREA	684.00 227.00 345.00	22903.00	330.00 24542.00 670.00 5220.00 1460.00	49.60	6965.00 7075.00 7580.00 297.00 594.00	54.00 8110.00 11730.00	120.00 87.00 143.00 19260.00	
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3TAT2	020 031 031 020		020 020 020 020	020 020 020 020	020 020 020 020	020 020 020 020	020 020 020 030	
LONGITUDE	0995518 0981850 0980130 0980130	0975010 0970800 0973300 0975120	0975120 0970734 1012051 1000113	1004210 0981400 0985100 0994245 0993400	0985116 0984650 0981400 0994440	0991221 0965500 0970224 0974020	0972510 0971339 0971053 09770712	
LATITUDE	394836 400310 395355 395315	2100 2100 3500 3655 4751	393655 392120 390101 384831	385630 384400 384700 384704 384600	384636 384738 384336 385440 384845	385312 385300 390152 383357 385149	383911 385547 384822 385424	
STATION NAME AND LOCATION	5 PRAIRIE DOG C AT NORTON, KS 6 REPUBLICAN R GUIDE ROCK NEB 6 REPUBLICAN RIVER NR BLOOMINGTON NEB 6 WHITE ROCK C AT LOVEWELL, KS 6 WHITE ROCK C AT LOVEWELL, KS	SALT C NR REPUBLICA REPUBLICA BUFFALO C REPUBLICA	BUFFALO C NR JAMESTOWN, KS 7 REPUBLICAN R AT CLAY CENTER, KS 2 NF SMOKY HILL R NR MCALLASTER, KS 3 SMOKY HILL R NR ARNOLD, KS 4 LADDER C BL CHALK C NR SCOTT CITY, KS	SB HACKBERRY C NR ORION, KS SMOKY HILL R ELLSWORTH KAN SALINE R NR RUSSELL KAN G CEDAR BLUFF HATCHERY DISCHARGE SMOKY HILL R NR ELLIS, KS	6 SMOKY HILL R NR RUSSELL, KS 6 SMOKY HILL R AT ELLSWORTH, KS 7 BIG C NR OGALLAH, KS 7 BIG C NR HAYS, KS	NF BIG C NR VICTORIA, KS LYON C NR WOODBINE KAN CHAPMAN C NR CHAPMAN KANS SMOKY HILL R AT LINDSBORG, KS SMOKY HILL R AT NEW CAMBRIA, KS	GYPSUM C NR GYPSUM, KS B MUD C AT ABILENE, KS B TURKEY C NR ABILENE, KS S SMOKY HILL P AT EMTEPPPISE, KS	
HYDROLOGIC Unit Code	10250015 10250016 10250016 10250016	10250017 10250017 10250017 10250017	10250017 10250017 10260002 10260003	10260005 10260006 10260006 10260006	10260006 10260006 10260006 10260007	10260007 10260008 10260008 10260008	10260008 10260008 10260008 10250008	

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OW BEGIN	1957 1957 1954 1945	1964 1964 1947 1971	1961 1971 1961 1945	1963 1958 1962 1946	1968 1963 1909 1957	1963 1970 1955 1957	1968 1968 1968	
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DRAINAGE AREA	300.00 230.00 696.00 1502.00 212.00	261. 261. 2820.	250. 849. 1367.	71.00 1040.00 1720.00 52.00	5530.00 10.20 384.00 6770.00 200.00	55280.00 243.00 297.00	10. 16. 49.	
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LONGITUDE	0970224 0965435 0995210 0985120	0983200 0982800 0982825 0982345	0974005 0991830 0984131 0990655 0992520	0985110 0993454 0984200 0985636 0985133	0980333 0973408 0975010 0972834 0964420	0955225 0961052 0961816 0961310	09557! 09558 09557. 09557(
307	30152 35305 30622 35800 30425	500 100 154 308 315	340 340 315 336 350	4800 2226 2500 2733 2245	330 330 328 328	208 344 152 100 642	7 4 5 4 7 5 7 7 4	
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STATION NAME AND LOCATION	CHAPMAN C NR CHAPMAN, KS LYON C NR WOODBINE, KS SALINE R NR WAKEENEY, KS SALINE R NR RUSSELL, KS PARADISE C NR PARADISE, KS	SALINE R NR WILSON, KS O SALINE RIVER NR SYLVAN GROVE KAN O WOLF C NR SYLVAN GROVE, KS O NB SPILLMAN C NR ASH GROVE, KS O SALINE R AT TESCOTT, KS	MULBERRY C NR SALINA, KS NF SOLOMON R AT GLADE, KS PORTIS KAN NF SOLOMON R PORTIS KAN NF SOLOMON R AT KIRWIN, KS DEER C NR PHILLIPSBURG, KS	M BEAVER C NR SMITH CENTER, KS SF SOLOMON R AB WEBSTER RE, KS S F SOLOMON R OSBORNE KAN SF SOLOMON R AT ALTON, KS KILL C NR BLODMINGTON, KS	SOLOMON R AT BELOIT, KS M PIPE C NR MILTONVALE, KS SALT C NR ADA, KS SOLOMON R AT NILES, KS CLARK C NR JUNCTION CITY, KS	SOLDIER C NR DELIA KAN MILL C NR PAXICO KA KANSAS R AT WAMEGO, KS VERMILLION C NR WAMEGO, KS	SOLDIER C NR GOFF, KS SOLDIER C NR BANCROFT, KS SOLDIER C NR SOLDIER, KS SOLDIER C NR CIRCLEVILLE, KS	
HYOROLDGIC UNIT CODE	10260008 10260008 10260009 10260009	10260009 10260010 10260010 10260010	10260010 10260011 10260012 10260012	10260012 10260013 10260014 10260014	10260015 10260015 10260015 10260015	10270102 10270102 10270102 10270102	10270102 10270102 10270102 10270102	

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DRAINAGE AREA	8	290.	19. 22. 52. 431.	922.	58460. 3. 425.	406. 59756. 38. 59928.	22.	345. 446.	
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1TAT2	020	020 020 020 020	020 020 020 020 020	020 020 020 020	020 020 020 020	020 020 020 020	020 020 020 020	031 031 031	
UDE	05	5225 4327 3157 3125	3349 2556 3050 3157 2713	845 716 221 752 315	39 00 15 15 37	31 39 52 30	33 53 40 40	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	
LONGITUDE	9 9 9 9	09552 09543 09531 09531	09533 09525 09530 09531 09527	09528 09527 09452 09457 09523	950039 951500 952315 951858	0950631 0950039 0945752 0945430	0943733 0955253 0955429 0954640 0954640	0970843 0971835 0970843 0965735	
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LATITUDE	392233	391208 390600 393117 392636	394147 393500 393250 393117 392752	392327 392403 390337 385900 390307	390659 385400 390307 385607 385440	392047 390659 385900 385611	390331 385350 385351 385632	405457 410605 405457 403540	
STATIOM NAME AND LOCATION	SOLDIER C NR ST. CLERE. KS	SOLDIER C NR DELIA, KS SOLDIER C NR TOPEKA, KS DELAWARE R NR MUSCOTAH KS ARRINGTON DELAWARE R	L DELAWARE R NR HORTON, KS L GRASSHOPPER C NR EFFINGHAM, KS L GRASSHOPPER C AT MUSCOTAH, KS DELAWARE R NR MUSCOTAH, KS COAL C NR ARRINGTON, KS	CDAL C NR HALF MOUND, KS DELAWARE R AT VALLEY FALLS, KS KANSAS R BONNER SPRINGS KAN KANSAS R AT DESOTA KANSAS KANSAS R AT LECOMPTON KANSAS	STRANGER C NR TONGANOXIE KS WAKARUSA R NR LAWRENCE KAN KANSAS R AT LECOMPTON, KS YANKEE TANK C NR LAWRENCE, KS WAKARUSA R NR LAWRENCE, KS	STRANGER CR AT EASTON, KS STRANGER C NR TONAANOXIE, KS KANSAS R AT DESOTO, KS CEDAR CHOTION, KS SKANSAS R AT BONNER SPRINGS, KS	TURKEY C AT KANSAS CITY KS WAKARUSA RIVER 4 MILES W OF AUBURN KS MAKARUSA RIVER 5 MILES W OF AUBURN KS SIXMILE CREEK TRIB 4 MILES NE OF AUBURN KS SIXMILE CREEK TRIB 5 MILES NE OF AUBURN KS	SEWARD LINCOLN CR BIG BLUE RIVER AT SURPRISE, NEBR. LINCOLN CREEK NEAR SEWARD, NEBR.	
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LONGITUDE	0970029 0965736 0963516	097 1038 097 1038 0970043 0963500 0962615	0964955 0963416 0980420 0965140	0971013 0970016 0965129 0934605	0933600 0935619 0934829 0933807 0930136	0931410 0932145 0931625 0931132 0931537	0930755 0931132 0925322 0925659	
LATITUDE	402837 403847 401500	352 352 300 103	392820 391414 401958 394640 394850	400654 395848 394633 394005 402110	401800 404318 403825 404145 395040	395345 400745 393825 404802 405712	405525 404802 404922 393126	
STATION NAME AND LOCATION	TURKEY C NR WILBER NEBR BIG BLUE RIVER NEAR CRETE, NEBR. BIG BLUE R AT BEATRICE NEBR BIG BLUE R AT BARNESTON NEBR	R WF BIG BLUE R BIG BLUE RIVER NR DORCHESTER, NEBR EEK NEAR WILBER, NEBR. R BARNESTON NE MILLION R NR FRANKFORT, KS R AT RANDOLPH, KS	FANCY C AT WINKLER, KS BIG BLUE R NR MANHATTAN, KS LITTLE BLUE RIVER NEAR DEWEESE, NEBR. L BLUE R NR BARNES KS MILL C AT WASHINGTON KANS	LITTLE BLUE RIVER NEAR FAIRBURY, NEBR. LITTLE BLUE R AT HOLLENBERG, KS L BLUE R NR BARNES, KS SHOAL C NR BRAYMER MO THOMPSON R NR MT MORAIH MO	WELDON R MILL GROVE MO ELK CREEK NEAR DECATUR CITY, IOWA THOMPSON RIVER AT DAVIS CITY, IOWA WELDON RIVER NEAR LEON, IOWA W YELLOW C BROOKFIELD MO	LOCUST C NR LINNEUS MO MEDICINE C NR GALT MO GRAND RIVER NEAR SUMNER MO PROMISE CITY SF CHARITON R CHARITON RIVER NEAR CHARITON, IOWA	HONEY CR. NR RUSSELL, IOWA SOUTH FORK CHARITON RIVER NEAR PROMISE CITY, CHARITON RIVER NEAR RATHBUN, IOWA MUSSEL FORK MUSSEL FORK CHARITON R	
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LATITUDE	392719 384230 382001 383150	384230 382001 381321 380109	375147 373747 374109 374203 372635	373600 383317 382844 382518 385449	385420 392020 383025 383917 383954	384236	
STATION NAME AND LOCATION	BEFKLCHARITON RHUNTSVILLE MODRAGON CNR BURLINGAME KANGARNETT POTTAWATOMIE CMARAIS DES CYGNES RMELVERN KANMARAIS DES CYGNES RNR READING KS	DRAGDON C NR BURLINGAME, KS POTTAWATOMIE C NR GARNETT, KS MARAIS DES CYGNES R NR KS-MO ST LINE, KS L OSAGE R AT FULTON KANS L OSAGE R AT FULTON, KS	MARMATON R NR FORT SCOTT, KS COX C 1 MILE S OF ARCADIA, KS COX C 2 MILES N OF ARCADIA, KS STOCKTON DAM DADEVILLE SAC R	7 POMME DE TERRE R NR BOLIVAR MO B BIG C BLAIRSTOWN MO B S GRAND R AT ARCHIE 1 OSAGE RIVER BELOW ST. THOMAS, MISSOURI	KANSAS CITY MO LITTLE BLUE R EXCELIOR SPRINGS EF FISHING R MOREAU R NR JEFFERSON CITY MO CAULKS CREEK BONHOMME CREEK	MISSOURI RIVER AT HERMANN, MO	
HYBROLOGIC Unit Code	10280203 10290101 10290101 10290101	10290101 10290101 10290103 10290103	10290104 10290104 10290106 10290106	10290107 10290108 10290108 10290111 10300101	10300101 10300101 10300200 10300200	10300200	

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STATION NAME AND LOCATION	ARKANSAS-WH	ALPENA ARK HUNTSVILLE ARK WEST FORK ARK HARDY ARK	POCAHONTAS ARK BATESVILLE ARK CLINTON ARK PANGBURN ARK	MULBERRY ARK DANVILLE ARK PERRYVILLE ARK CONWAY ARK	RUSSELLVILLE ARK GENTRY ARK CANADIAN R AT CALVIN OK CIMARRON R NR BUFFALO OK BEAVER R AT BEAVER OK	BEAYER R NR GOYMON OK DEQUEEN ARK RED R NR DE KALB TX N F RED R NR HEADRICK OK WHITE RIVER AT CALICO ROCK, ARK.	NORTH SYLAMORE CREEK NEAR FIFTY SIX, ARK. FISHDAM 6 MI NORTH NAOMA FISHDAM 5 MI NORTH NAOMA WHITEFISH RIVER 6 MI NW RAPID R WHITEFISH 12M N GLADSTONE MICH	NORTH FORK R NR TECUMSEH MO BLACK R NR ANNAPOLIS MO BLACK R AT POPLAR BLUFF MO , ST FRANCIES RIVER NR GLENNONVILLE, MO	
HYBROLOGIC Unit Code		110044 B 110044 B 110044 B 110044 G	110044 I 110044 V 110044 K 110044 K	110044 N 110044 O 110044 Q 110044 R	110044 R 110045 U 11004500 11004600	11004700 110049 G 11005000 11010004	11010004 11010005 11010005 11010005	11010006 11010007 11010007	

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LATITUDE		37 103; 37 105; 3606 1; 35362;	3515 3815 3814 3815	381600 381600 382602 382318 382014	3816 3816 3847 3847 3849	385537 380202 380508 370837 380134	375758 375721 382852 382020 374451	3742 3735 3755 3755	
STATION NAME AND LOCATION		CURRENT RIVER ABOVE POWDER MILL JACKS FORK ABOVE TWO RIVERS BLACK RIVER AT BLACK ROCK, ARK. WHITE RIVER AT NEWPORT, ARK.	SOUTHEAST WHITE COUNTY - SEARCY HALFMOON CREEK NEAR MALTA, CO. ARKANSAS RIVER AT PARKDALE, CO. BESSEMER DITCH	BESSEMER DITCH BESSEMER D ARKANSAS RIVER AT CANON CITY, CO. ARKANSAS RIVER AT PORTLAND, CO. ARKANSAS RIVER NEAR PORTLAND, CO.	ARKANSAS RIVER ABOVE PUEBLO, CO. ARKANSAS RIVER NEAR PUEBLO, CO. SOUTH CHEYENNE C AT BROADMOOR COLO NORTH CHEYENNE C AT BROADMOOR COL	BLUE R DIV NR GREEN MTN FALLS COLO PURGATOIRE R NR LAS ANIMAS COLO ARKANSAS R AT LAS ANIMAS COLO PURGATOIRE RIVER BELOW TRINIDAD LAKE, CO. ARKANSAS RIVER NEAR COOLIDGE, KANS.	ARKANSAS R AT SYRACUSE, KS ARKANSAS R AT GARDEN CITY, KS WHITEWOMAN C NR LEOTI, KS WHITEWOMAN C NR MODOC, KS ARKANSAS R AT DODGE CITY, KS	ARKANSAS R TR NR DODGE CITY, KS MULBERRY C NR DODGE CITY, KS ARKANSAS R NR KINSLEY, KS WHITEWOMAN C NR BELLEFONT, KS	
HYDROLOGIC Unit CODE		11010007 11010008 11010013 11010013	11020001 11020001 11020001 11020002	11020002 11020002 11020002 11020002 11020002	11020002 11020002 11020003 11020003 11020003	11020003 11020009 11020010 11030001	11030001 11030001 11030002 11030003	11030004 11030004 11030004 11030004	-

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LONGITUDE		1002100 0995710 0992050 1002454	0995250 0992207 0991826 0990050 0985839	0985230 0982500 0974629 0983500 0985135	0982527 0981130 0973530 0972316 0972006	0971631 0972412 0970332 0975609	0972520 0964650 0970137 0970243	0970731 0970450 0970045 0965940	
LATITUBE		380342 381740 381200 382858	382701 382807 382416 382740 382712	375220 381350 375647 383120 383210	383553 381830 380644 374956 373841	373234 371500 370323 375041 373351	372734 375650 375810 375352 375018	375208 374901 374745 371327	٠
STATION NAME AND LOCATION		ARANNEE T N RALVESTA, KS GAZZLERS GULCH NR NESS CITY, KS F PAWNEE R NR LARNED, KS S WALNUT CR TR NR DIGHTON, KS	TONG BRANCH C NR NESS CITY, KS WALNUT C NR RUSH CENTER, KS OTTER C NR RUSH CENTER, KS WALNUT C AT ALBERT, KS	RATTLESNAKE C NR MACKSVILLE, KS RATTLESNAKE C NR RAYMOND, KS ARKANSAS R NR HUTCHINSON, KS COW C NR CLAFLIN, KS BLOOD C NR BOYD, KS	PLUM C NR HOLYROOD, KS 1 COW C NR LYONS, KS 2 L ARKANSAS R AT ALTA MILLS, KS 2 L ARKANSAS R AT VALLEY CENTER, KS 3 ARKANSAS R AT WICHITA, KS	ARKANSAS R AT DERBY, KS SLATE C AT WELLINGTON, KS ARKANSAS R AT ARKANSAS CITY, KS INF NINNESCAH R AB CHENEY RE, KS SF NINNESCAH R NR MURDOCK, KS	NINNESCAH R NR PECK, KS COLE C NR DEGRAFF, KS WHITEWATER R 2 MILES N OF POTWIN, KS WHITEWATER R 3 MILES S OF POTWIN, KS WHITEWATER R 6 MILES NW OF TOWANDA, KS	WB WHITEWATER R NR FURLEY, KS WB WHITEWATER R NR BENTON, KS WHITEWATER R AT TOWANDA, KS WALNUT R AT WINFIELD, KS	
HYDROLOGIC Unit Code		11030005 11030005 11030005	11030007 11030008 11030008 11030008	11030009 11030009 11030010 11030011	11030011 11030011 11030012 11030012	11030013 11030013 11030014 11030014	11030016 11030017 11030017 11030017	11030017 11030017 11030017 11030018	

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LONGITUBE	1032525 1032525 1025731 1015354	1012357 1014540 1005510 1002939	1001155 0995448 0992845 0993000 0992040	0992845 0992356 0980003 0972932 0970149	0970248 0970018 0965200 0982804 0973604	0964322 0960605 0954049 0960333 0961330	0960333 0955000 0952805 0954043	
LATITUDE	365915 365915 365536 371127	373337 373735 371427 370045 365900	370202 371136 370136 371110 371600	370155 (365528 (361905 (354753 (355732 (355732 (360553 (360707 (370217 (370744 (363009 (380815 (372926 (373834 (374230 (373834 (373030 (371600 (371326 (
STATION NAME AND LOCATION	DRY CIMARRON R NR GUY, NM DRY CIMARRON R NR GUY, NM CIMARRON RIVER NR KENTON, OK NF CIMARRON R TR NR ELKHART, KS NF CIMARRON R AT RICHFIELD, KS	NF CIMARRON R NR ULYSSES, KS BEAR C NR JOHNSON, KS CIMARRON R AT LIBERAL, KS CIMARRON RIVER NR FORGAN, OK CIMARRON RIVER NR MOCANE, OK	CROOKED C NR NYE, KS KIGER C NR ASHLAND, KS CIMARRON RIVER NR BUTTERMILK, KS BLUFF C NR PROTECTION, KS CAVALRY C AT COLDWATER, KS	BLUFF CREEK NR BUTTERMILK, KS CIMARRON RIVER NR BUFFALO, OK TURKEY CREEK NR DRUMMOND, OK COTTONWOOD CREEK AT SEWARD, OK CIMARRON RIVER AT PERKINS, OK	STILLWATER CREEK AT STILLWATER, OK WEST FORK BRUSH CREEK NR STILLWATER, OK COUNCIL CREEK NR STILLWATER, OK MEDICINE LODGE R NR KIOWA, KS CHIKASKIA R NR CORBIN, KS	ARKANSAS RIVER AT RALSTON, OK VERDIGRIS R NR MADISON KS VERDIGRIS R NR ALTOONA KANS FALL R NR FALL RIVER KANS OTTER C AT CLIMAX, KS	FALL R NR FALL RIVER, KS FALL R AT FREDONIA, KS BIG HILL C NR CHERRYVALE KANS VERDIGRIS R AT INDEPENDENCE, KS	
HYDROLOGIC Unit Code	11040001 11040001 11040001 11040003	11040003 11040005 11040006 11040006	11040007 11040008 11040008 11040008	11050001 11050001 11050002 11050003	11050003 11050003 11050003 11060003	11060006 11070101 11070101 11070102	11070102 11070102 11070103 11070103	

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STATION NAME AND LOCATION	BIG VERC E F	ELK R AT ELK FALLS, KS ELK R BL ELK CITY LK, KS VERDIGRIS R NR CLAREMORE OK VERDIGRIS RIVER NR SAGEEYAH, OK VERDIGRIS RIVER NR INOLA, OK NEWT GRAHAM LOCK AND DAM NR INOLA, OK CANEY R NR ELGIN KANS	DOUBLE CREEK SWS 5 NR RAMDNA, OK NEOSHO R NR AMERICUS, KS NEOSHO R NR PARSONS, KS LIMESTONE C NR BEULAH, KS LIGHTNING C NR MCCUNE, KS	DEER C NR WEST MINERAL, KS DEER C NR HALLOWELL, KS DEER C NR OSWEGO, KS LIGHTNING C NR OSWEGO, KS CHERRY C NR WEST MINERAL, KS	L CHERRY C NR WEST MINERAL, KS CHERRY C NR HALLOWELL, KS NEOSHO R AT CHETOPA, KS CHERRY C 3 MILES W OF FAULKNER, KS CENTER C 6.5 MILES SW OF HALLOWELL, KS	CHERRY C 2 MILES W OF FAULKNER, KS TR TO CHERRY C 5.5 MILES NE OF HALLOWELL, KS CHERRY C 4.5 MILES SW OF HALLOWELL, KS NEOSHO R 2 MILES E OF OSWEGO, KS DENNY B C 2 MILES E OF HALLOWELL, KS	CHERRY C 2 MILES NE OF HALLOWELL, KS CHERRY C 3 MILES NE OF HALLOWELL, KS TR TO L CHERRY C 6.5 MILES S OF WEST MINERAL TR TO L CHERRY C 7.5 MI SE OF WEST MINERAL	
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LONGITUDE	0945341 0945241 094551 0945517 0945417	0945020 0945318 0944828 0945206 0945726	0944430 0944254 0943848 0944030 0944048	0944219 0941840 0943610 0942449 0943455	0944445 0944426 0943822 0943911 0943512	0951600 0951033 0951611 0951425 0951345	0951345 1042742 1042345 1044708	
LATITUDE	371323 371414 371502 371514 371554	371650 371652 371738 371805 365543	372349 372625 372718 372204 371835	371832 370618 370920 370425	365604 370225 370503 371320 363750	355600 365409 364711 364618 355115	355115 364714 364613 354050	
STATION NAME AND LOCATION	TR TO TR TO L CHERRY C 5.5 MI S OF W MINERAL L CHERRY C 4 MILES SE OF WEST MINERAL. KS TR TO CHERRY C 1.5 MILES S OF WEST MINERAL. KS CHERRY C 2 MILES SE OF WEST MINERAL, KS TR TO CHERRY C 2 MILES S OF WEST MINERAL, KS	L CHERRY C 2 MILES SW OF SCAMMON, KS CHERRY C 2 MILES E OF WEST MINERAL, KS L CHERRY C 1.5 MILES NE OF SCAMMON, KS CHERRY C 4 MILES NE OF WEST MINERAL, KS NEOSHO RIVER NR COMMERCE, OK	SECOND COW C AT PITTSBURG, KS FIRST COW C AT FRONTENAC, KS EAST COW C AT FRONTENAC, KS EAST COW C NR PITTSBURG, KS COW C NR WEIR, KS	BRUSH C NR WEIR, KS CENTER CREEK NEAR FIDELITY, MO CENTER CREEK NEAR SMITHFIELD, MO. TURKEY CREEK AT DUNWEG, MO TURKEY CREEK NEAR JOPLIN, MO	SPRING RIVER NR QUAPAW, DK WILLOW C AT BAXTER SPRINGS, KS SHORT C AT GALENA, KS COW C NR LAWTON, KS ELK RIVER NR TIFF CITY, MO	NEOSHO R NR WAGDNER DK BIG CABIN C NR WELCH, OK W F BIG CABIN C NR CENTRALIA, OK M F BIG CABIN C NR PYRAMID CORNERS, OK NEOSHO RIVER BLW FT GIBSON LAKE NR FT GIBSON	HEOSHO R BL FT GIBSON LK NR FT GIBSON CANADIAN RIVER NEAR HEBRON, NM CHICORICA CREEK NEAR HEBRON, NM VERMEJO RIVER NEAR DAWSON, NM	
HYDROLOGIC Unit Code	11070205 11070205 11070205 11070205	11070205 11070205 11070205 11070206	11070207 11070207 11070207 11070207	11070207 11070207 11070207 11070207	11070207 11070207 11070207 11070207	11070209 11070209 11070209 11070209	11080001 11080001 110377731	

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UDE	36	1042239 1030236 1032340 1015245	1002212 1002213 0982245 0973554	0971300 0963301 0951419 0953916	0953415 0953419 0953421 0955100	0951419 0950549 0950756 1012930 1003105	0991640 0961225 0972100 0965320	0965120 0960408 0955257 0960013	
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STATIDN NAME AND LOCATION	CANADIAN R NR TAYLOR SPRINGS, NM	RIVER NEAR SANCHEZ, NM RIVER ABOVE NM-TX STATE LINE, NM CREEK NEAR LOGAN, NM RIVER NR AMARILLO, TEX.	BRIDGE ON US 60-83 AT CANADIAN CANADIAN R NR CANADIAN, TX CANADIAN RIVER AT BRIDGEPORT, OK CANADIAN RIVER NR NEWCASTLE, OK	LITTLE RIVER BLW LK THUNDERBIRD NR NORMAN, O LITTLE RIVER NR SASAKWA, OK CANADIAN R NR WHITEFIELD OK BRUSHY CREEK NR HAILEVILLE OK PEACEABLE CREEK NR HAILEVILLE OK	BLUE CREEK TRIB NEAR BLOCKER OK BLUE CREEK TRIB NR BLOCKER, OK BLUE CREEK NR BLOCKER, OK DEER CREEK NR MCALESTER OK MATHULDY CREEK NR CROWDER, OK	CANADIAN RIVER NR WHITEFIELD, OK TALOKA CREEK AT STIGLER OK TALOKA CREEK NEAR STIGLER OK BEAVER RIVER NR GUYMON, OK BEAVER RIVER AT BEAVER, OK	WOLF C LIPSCOMB NORTH CANADIAN RIVER AT WOODWARD, OK NORTH CANADIAN RIVER NR WETUMKA, OK DEEP FORK NR ARCADIA, OK BELLCOW CREEK AT CHANDLER, OK	DRY CREEK NR KENDRICK, OK DEEP FORK NR BEGGS, OK DEEP FORK NEAR DEWAR, OK ARKANSAS R AT TULSA OK	
HYDRDLOGIC Unit Code	1080003		11090106 11090106 11090201 11090202	11090203 11090204 11090204 11090204	11090204 11090204 11090204 11090204	11090204 11090204 11090204 11100101	11100203 11100303 11100303 11100303	11100303 11100303 11110101	

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LATITUOE	54815 60648 60837 54610	352058 352542 352016 350608 351013 352058	351511 352546 345508 345525 345444	345623 345727 345734 350020 345933	345930 350121 350834 340740 350750	351035 350945 350930 351130	351246 352600 353400 352902
STATION NAME AND LOCATION	ARKANSAS R NR TULLAHASSEE OK ARKANSAS RIVER AT SAND SPRINGS NR TULSA, OK ARKANSAS RIVER AT TULSA, OK ARKANSAS RIVER AT TULSA, OK	ARKANSAS R NR SALISAW OK ARKANSAS R AT VAN BUREN ARK LITTLE SANS BOIS CREEK NR STIGLER, OK SANS BOIS CREEK NR QUINTON, OK MULE CREEK NR MCCURTAIN, OK ARKANSAS RIVER NR SALLISAW, OK	COAL CREEK NR SPIRO OK ARKANSAS RIVER AT VAN BUREN, ARK. POTEAU RIVER AT CAUTHRON, ARK. FOURCHE MALINE NR WILBURTON OK	RED DAK CREEK NR RED DAK OK CASTON CREEK AT WISTER OK MORRIS CREEK AT HOWE OK SUGARLOAF CREEK NR MONROE OK BRAZIL CREEK NEAR RED OAK OK	ROCK CREEK NEAR RED OAK OK BRAZIL CREEK NEAR WALLS OK WILDHORSE CREEK NR MCCURTAIN, OK OWL CREEK NR MCCURTAIN OK WOLF CREEK NR MCCURTAIN, OK	DOE CREEK NR BOKOSHE, OK JAMES FORK NEAR HACKETT, ARK. JAMES FORK NR WILLIAMS, OK COAL CREEK NR BOKOSHE, OK COAL CREEK NR PANAMA. OK	HOLI-TUSKA CREEK NR PANAMA OK HARTMAN - CLARKSVILLE MULBERRY R NR MULBERRY ARK ARKANSAS R AT OZARK ARK
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LONGITUDE		0941754 0934846 0932000 0932800	0935255 0930858 0930858 0935525 0933700	0933900 0934542 0921610 0922132 0920918	1012449 1005625 1005500 1004443	1004613 1002000 1001508 1001137	1001314 0993028 0992255 0993025	0990547 0983200 1001705 1001803	
LATITUDE		352056 352821 352200 352800 352800	351230 351334 351334 350625 345900	345200 343503 344458 344727 344007	345015 343740 344030 343423 343423	343227 343420 343526 343409 345727	345727 345132 342844 351005 345451	343804 340630 341630 341231	
STATION NAME AND LOCATION		ARKANSAS R. AT DAM NO. 13, NR VAN BUREN, ARK ARK RIVER AT OZARK DAM AT OZARK, ARK. KNOXVILLE-CLARKSVILLE SPADRA C AT CLARKSVILLE ARK ILLINDIS BAYOU NR SCOTTSVILLE ARK	SIXMILE C SWS 6 NR CHISMVILLE ARK ARKANSAS R AT DARDANELLE ARK ARKANSAS RIVER AT DARDANELLE, ARK. PETIT JEAN C NR BOONEVILLE ARK DUTCH C AT WALTREAK ARK	FOURCHE LA FAVE R NR GRAVELLY ARK CEDAR CREEK ARKANSAS R AT LITTLE ROCK ARK ARK RIV AT MURRAY DAM, NR LITTLE ROCK, ARK ARKANSAS R & DAVID D TERRY L&D BL LITTLE ROC	POTF RED RIVER NEAR WAYSIDE, TEX. PRAIRIE DOG TOWN FORK RED R NR BRICE TEX (DI MULBERRY CREEK NEAR BRICE, TEX.(DISC) POT F RED R NEAR LAKEVIEW POTF RED RIVER NR LAKEVIEW, TEX.	LITTLE RED RIVER NEAR TURKEY, TEX. JONAH CREEK AT WEIR NEAR ESTELLINE, TEX SALT CREEK NEAR ESTELLINE, TX (DISC) POTF RED RIVER NR CHILDRESS, TEX. BRIDGE ON US 83 NORTH OF WELLINGTON	SALT FORK RED RIVER NR WELLINGTON, TX SALT FORK RED RIVER AT MANGUM, OK SALT FORK RED RIVER NR ELMER OK NORTH FORK RED RIVER NR CARTER, OK ELK CREEK NR HOBART, OK	NORTH FORK RED RIVER NR HEADRICK, OK RED RIVER NR BURKBURNETT, TX NORTH PEASE RIVER NEAR CHILDRESS, TEXAS MIDDLE PEASE RIVER NEAR PADUCAH, TEXAS	
HYDROLOGIC UNIT CODE		11110201 11110201 11110202 11110202	11110202 11110203 11110204 11110204	11110206 11110206 11110207 11110207	11120103 11120103 11120105 11120105	11120105 11120105 11120105 11120105	11120202 11120202 11120202 11120303	11120303 11130102 11130103 11130104	

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OW BEGIN	1967 1952 1973 1979	1966 1969 1966 1966	1953 1966 1954 1968 1968	1947 1959 1909 1946 1962	1960 1948 1945 1964 1964	1944 1959 1944 1947 1978	1978 1976 1977 1977
NIZAB Descriptor	004 004 004	000 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	124 014 004 024 014	0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	024	124 004 124 014	400
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DRAINAGE AREA	2754. 178. 30782. 1128.	937.00 499.00 584.00 1874.00	481. 652. 563. 1551.	243. 1977. 3129. 313. 208.	35. 208. 4706. 7202.	39720. 8321. 39720. 1087.	445. 176.
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3TAT2	048 048 040 040 048	048 048 048 048	048 040 048 040	040 040 040 040	040 040 040 040	048 048 040	040 040 040
LONGITUDE	1000424 0980505 0970935 1001238	0994710 1000049 0994802 0992318 0983200	0983646 0985417 0980257 0965051 0991010	0990235 0985757 0983349 0982545 0981520	0974928 0975708 0975221 0976600	0963347 0994403 0963347 0955443 0961356	0960712 0955230 0961522 0961547
LATITUDE	341339 334846 334340 341128	334914 333918 333839 334201 335434	333945 335421 341300 334208 353220	353450 353152 350702 350815 351030	350238 345641 345818 342700 341403	334908 342447 334908 341617 342706	342323 341854 342655 342743
STATION NAME AND LOCATION	PEASE RIVER NEAR CHILDRESS, TEX. EAST FORK LITTLE WICHITA R NEAR HENRIETTA, T RED RIVER NR GAINESVILLE, TX M PEASE R AT PL XING N PADUKAH NORTH WICHITA RIVER NEAR PADUCAH, TEX.	NORTH WICHITA RIVER NEAR TRUSCOTT, TEX. SOUTH WICHITA RIVER & ROSS RANCH NR BENJAMIN SOUTH WICHITA RIVER NEAR BENJAMIN, TEX. WICHITA RIVER NR SEYMDUR, TEX.	LITTLE WICHITA RIVER NEAR ARCHER CITY, TEX. BEAVER CREEK NR ELECTRA, TEX. BEAVER CREEK NR WAURIKA, OK MINERAL CREEK NEAR SADLER, TEX.(DISC) WASHITA RIVER NR FOSS, OK	BARNITZ CREEK NR ARAPAHO, OK WASHITA RIVER 'NR CLINTON, OK WASHITA RIVER AT CARNEGIE, OK COBB CREEK NR FORT COBB, OK SUGAR CREEK NR GRACEMONT, OK	EAST BITTER CREEK NR TABLER, OK LITTLE WASHITA RIVER NR NINNEKAH, OK WASHITA RIVER NR TABLER, OK WASHITA R'NR DOUGHERTY OKLA WASHITA RIVER NR DURWOOD, OK	RED R AT DENISON DAM NR DENISON TX RED RIVER NR QUANAH, TX RED RIVER AT DENISON DAM NR DENISON, TX MUDDY BOGGY C NR FARRIS OK COAL CREEK NEAR LEHIGH OK	MUDDY BOGGY CREEK AT ATOKA OK MCGEE CREEK NR FARRIS OK O1S-10E-21DCD 3 COAL CK TRIB NR TOWN OF LEHI O1S-10E-16CCD 1 COAL CK TRIBUTARY
HYDROLOGIC Unit Code	11130105 11130201 11130201 11130204	11130204 11130205 11130205 11130206 11130206	11130206 11130207 11130208 11130210	11130302 11130302 11130302 11130302	11130302 11130302 11130303 11130303	111349 D 111350 E 11140101 11140103	11140103 11140103 11140103 11140103

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MISAB BOTGIRDS30	004 004 014	0 4 4 10	900	004	014	0 14	
DRAINAGE AREA	1423.00 140.10 75.00 1173.00	4119.00 52300.00 52336.00 60613.00	60613.00 2628.00 707.00	66860.00 66860.00 93.90 2774.00	3400.00 3540.00 3137.00	850.00 47348.00	
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LONGITUDE	0952903 0943645 0944934 0944934	0935753 0934856 0934920 0934849	0934425 0932535 0933316 0932630 0932705	0924313 0924313 0931810 0950750	0940907 0935958 0950500 0935240	0943008 0944139	
LATITUDE	341202 343818 335026 335608	334128 333626 333626 333626	323055 321410 321131 315920 315622	313058 313058 320255 332320 331500	331815 331432 331900 323845 325419	324450 334115	
STATION NAME AND LOCATION	KIAMICHI R NR BELZONI OK KIAMICHI RIVER NR BIG CEDAR, OK LITTLE PINE CREEK NEAR KANAWHA, TEX. LITTLE RIVER NR IDABEL, OK MOUNTAIN FK NR EAGLETON OK	LITTLE RIVER AT MILLWOOD DAM NR ASHDOWN, ARK RED RIVER AT FULTON, ARK. RED RIVER NR HOSSTON, LA RED RIVER AT FULTON, ARK.	RED R AT SHREVEPORT LA LDGGY BAYOU NR NINOCK, LA BAUOU PIERRE BELOW CASPIANA BAYOU PIERRE AT EVELYN CHEMARD LAKE NR EVELYN	7 RED RIVER AT COLFAX, LA. 7 RED RIVER AT COLFAX, LA (CE 04450) 9 GRAND BAYOU NEAR COUSHATTA, LOUISIANA 2 SULPHUR R NR TALCO 2 SULPHUR R NR NAPLES TEX	SULPHUR RIVER NR TEXARKANA, TEX. SULPHUR RIVER SOUTH OF TEXARKANA, ARK. WHITE OAK C NR TALCO TWELVEMILE BAYOU NEAR DIXIE, LA. CYPRESS CREEK NR DAINGERFIELD, T	CYPRESS CREEK NR RED RIVER NEAR DE	
HYDROLOGIC Unit CODE	11140105 11140105 11140105 11140105	11140109 11140201 11140201 11140201	11140204 11140204 11140206 11140206	11140207 11140207 11140209 11140302	11140302 11140302 11140303 11140304	11140306 111449 H	

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LONGITUDE	Z	0933630 0942728 0940058 0933930	354 536 509 448 505	0940530 0940536 0943828 0980443 0974140	0970123 0965333 0972257 0970505	0971051 0964925 0964925 0965333	0971725 0962745 0964408 0962744 0960620	0963543 0961943 0964302 n962215
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LATITUDE	_=	304449 322211 315844 315230 301813	301110 321834 313445 310755 310830	302121 302122 313658 331736	323503 331700 333636 332311 332423	332155 332155 332154 331700	330708 322535 324227 322536 320805	324959 323047 314801 320630
STATION NAME AND LOCATION	TEXAS-GL	SABINE RIVER NR BON WEIR, TEX. SABINE R NR TATUM TEX SABINE R AT LOGANSPORT LA BAYOU SAN PATRICIO NEAR BENSON, LA. SABINE RIVER NR RULIFF, TEX.	COW BAYOU NEAR MAURICEVILLE, TEXAS KICKAPOO C NR BROUNSBORO NECHES RIVER NEAR ALTO, TEX. NECHES R NR DIBOLL PINEY C NR GROVETON	NECHES RIVER AT EVADALE US96 NECHES RIVER AT EVADALE, TEX. BAYOU LA NANA AT NACOGDOCHES WEST FORK TRINITY RIVER NEAR JACKSBORO, TEXA BIG SANDY CR NR BRIDGEPORT TEX	MOUNTAIN CREEK NEAR CEDAR HILL, TEX. LITTLE ELM C NR AUBREY ELM FK TRINITY RIVER NEAR, MUENSTER, TEX. (DIS ELM FORK TRINITY RIVER NEAR SANGER, TEX. ISLE DU BOIS CREEK NEAR PILOT POINT, TEXAS	CLEAR CREEK NR SANGER, TEX. LITTLE ELM CR NR CELINA, TEX. (DISC) LITTLE ELM CR NR CELINA, TEX. (DISC) LITTLE ELM CREEK NEAR AUBREY, TEX. LITTLE ELM CR NR AUBREY, TEX.	DENTON CREEK NEAR JUSTIN, TEXAS TRINITY R NR ROSSER TRINITY RIVER BELOW DALLAS, TEX. TRINITY RIVER NEAR ROSSER, TEXAS	DUCK CREEK NEAR GARLAND, TEX. KINGS CREEK NEAR KAUFMAN, TEX. PIN DAK CR NR HUBBARD, TEX.(DISC) CHAMBERS C NP COPSICANA
HYDROLOGIC Unit CODE		120051 C 12010002 12010004 12010004	12010005 12020001 12020001 12020002	12020003 12020003 12020005 12030101	12030102 12030103 12030103 12030103	12030103 12030103 12030103 12030103	12030104 12030105 12030105 12030105	12030 106 12030 107 12030 108 12030 109

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MISAB ROTGIRJEBO	124 124 124	004 004 004	004 003 003	004 023 023 124	124 014 004	00 4 4 4 4 4 4 4	124	
DRAINAGE AREA	12833.00 13911.00	828.00 34.50 409.00	285.00 105.00 307.00 5.77	11.50 94.90 69.60 87.70	45007.00 1466.00 8796.00 5130.00	88.80 15538.00 104.00 1416.00	3988.00 454.00	
TYPE OF STIR	N N N N N N N N N N N N N N N N N N N	SSSSS	S S S S S S	S E E E E	N K K K K K K K K K K K K K K K K K K K	N N N N N	SEE	
CONNIL	225 001 373 291	291 339 339 339 201	201 291 339 201 201	201 201 201 071	157 169 433 433	433 023 023 447 253	253 503 417	
3TAT2	048 048 048 048 048	048 048 048 048	048 048 048 048	048 048 048 048	048 048 048 048	048 048 048 048	048 048 048 048	
LONGITUDE	0953925 0954721 0953927 0945731	0945102 0952727 0952726 0952838	0952544 0950614 0951808 0953327 0953542	0953343 0952443 0951824 0944930 0951914	0953158 1011150 1001049 1001415	1001247 0991606 0991602 0992753 0994853	0993830 0984610 0991327 0990952	
LATITUDE	312020 313854 312008 304258 302530	302530 301436 301441 300804 300637	300208 302011 301534 294543 293955	293923 294149 295505 29420 292209	293456 330218 330029 332000	331400 333448 333451 331945 323553	325550 325730 325604 324121	
STATION NAME AND LOCATION	TRINITY R NR CROCKETT TEX TRINITY RIVER NEAR OAKWOOD, TEX TRINITY RIVER NR CROCKETT, TEX. LONG KING C NR LIVINGSTON TRINITY R AT ROMAYOR, TEXAS	TRINITY R AT ROMAYOR BRIDGE ON US 75 SOUTH OF CONROE WEST FORK SAN JACINTO RIVER NR CONROE, TX PANTHER BRANCH NEAR SPRING, TEX. SPRING CREEK NEAR SPRING, TEX.(DISC)	CYPRESS CREEK NEAR WESTFIELD, TEXAS EF SAN JACINTO R NR CLEVELAND CANEY CREEK NEAR SPLENDORA, TEXAS BUFFALO BAYOU AT WEST BELT DRIVE AT HOUSTON, KEEGANS BAYOU AT KEEGAN ROAD NEAR HOUSTON,	KEEGANS BAYOU AT ROARK ROAD NEAR HOUSTON, TE BRAYS BAYOU AT HOUSTON, TEX. GREENS BAYOU NEAR HOUSTON, TEX. GALVESTON BAY TRINITY BAY PT B CHOCOLATE BAYOU NEAR ALVIN, TEX.	BRAZOS RIVER AT RICHMOND, TEX. DOUBLE MOUNTAIN FK BRAZOS R AT JUSTICEBURG, DMF BRAZOS RIVER NEAR ASPERMONT, TEX. BRIDGE ON US 83 NORTH OF ASPERMONT SALT FK BRAZOS R NR ASPERMONT, TX	STINKING CREEK NEAR ASPERMONT, TEX. AT US 183-283 AT SEYMOUR BRAZOS RIVER AT SEYMOUR, TEX. MILLERS CREEK NEAR MUNDAY, TEX. CLEAR FORK BRAZOS RIVER AT HAWLEY, TEX.	CALIFORNIA C NR STAMFORD CLEAR F OF BRAZOS R AT ELIASVILLE CLEAR FORK BRAZOS RIVER AT FORT GRIFFIN, TEX HUBBARD CREEK NEAR ALBANY, TEX. (DISC)	
HYDROLOGIC UNIT CODE	12030201 12030201 12030201 12030201 12030202	12030203 12040101 12040101 12040102	12040102 12040103 12040103 12040104 12040104	12040104 12040104 12040104 12040203 12040204	12040204 12050004 12050007 12050007	12050007 12060101 12060101 12060101	12060103 12060104 12060104 12060105	

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OW BEGIN	1963 1961 1963	1942 1964 1963 1962 1966	1966 1966 1962 1966	1957 1965 1967 1953 1966	1930 1963 1958 1976 1976	1966 1946 1979 1960 1958	1967 1947 1942 1946	
BASIN DESCRIPTOR	004	124	00 00 4 4 4	024 024 124	004 124 00 4	014 124 004 124	124	
DRAINAGE AREA	61.00 39.30 288.00	30436.00	23.00 244.00 195.00	1454.00 376.00 45339.00	33.30 7065.00 83.10 9903.00	15407.00 15770.00 10260.00 16840.00 6415.00	24040.00	
TYPE OF	AS AS AS	A A S A A S A S A S A S A S A S A S A S	AS A	S K K K K K K K K K K K K K K K K K K K	AS AS AS	NS A A S	AS AS	
COUNTY	417 714 714	503 363 503 193 145	331 051 051 051 395	041 015 157 099 411	411 053 331 491 335	081 081 399 399 095	307 053 053 411	
3TAT2	048 048 048 048	048 048 048 048	048 048 048 048	048 048 048 048	048 048 048 048 048	048 048 048 048 048	048 048 048 048	
LONGITUDE	09916 09916 09900		0965917 0964903 0963027 0962725	0961132 0961218 0953456 0974535 0984240	0983350 0980212 0965701 0973921 1010049	1004556 1002849 1000134 0995713 0995509	0993425 0982500 0982300 0983351	
LATITUDE	324101 324227 324327 323952	330130 325200 330127 315040 315839 310802	302422 302422 301918 302511 311010	305210 295251 292058 312605	311305 305441 304953 304128	320337 315307 314255 314358 313057	312937 304505 304400 311304	
STATION NAME AND LOCATION	SALT PRONG HUBBARD CR AT 380 NR MORAN,TEX.(D NORTH FORK HUBBARD CREEK NR ALBANY, TEX. SNAILUM CREEK NR ALBANY, TEX. (DISC) BIG SANDY CREEK NR BRECKENRIDGE, TEX.(DISC)	BRAZOS R NR SOUTH BEND BRAZOS R AT POSSUM KINGDOM DAM BRAZOS RIVER NEAR SOUTH BEND,TEXAS AQUILLA C NR AQUILLA N BOSQUE R AT HICO BRAZOS RIVER NR HIGHBANK, TEX.	LITTLE POND CREEK AT BURLINGTON, TEX. EAST YEGUA CREEK NEAR DIME BOX, TEX. YEGUA C NR SOMERVILLE DAVIDSON CREEK NEAR LYONS, TEX. NAVASOTA R NR EASTERLY	NAVASOTA RIVER NR BRYAN, TEX. MILL CREEK NR BELLVILLE, TX BRAZOS RIVER NR ROSHARON, TEX. LEON R AT GATESVILLE SAN SABA R AT SAN SABA	COLORADO R NR SAN SABA SOUTH FORK ROCKY CREEK NEAR BRIGGS, TEX. LITTLE RIVER AT CAMERON, TEX. BERRY CREEK NEAR GEORGETOWN, TEX. BEALS CRK NR WESTBROOK, TX	COLORADO RIVER ABOVE SILVER, TEX. COLORADO RIVER AT ROBERT LEE, TEX. COLORADO R NR BALLINGER TX COLORADO RIVER AT BALLINGER, TEX. CONCHO RIVER AT PAINT ROCK, TEX.	COLORADO RIVER NEAR STACY, TEX. COLORADO R AT BUCHANAN DAM COLORADO R AT INKS DAM COLORADO RIVER NR SAN SABA, TEX.	
HYDROLDGIC Unit Code	12060;05 12060;05 12060;05	12060201 12060201 12060201 12060204 12070101	12070101 12070101 12070102 12070102 12070103	12070103 12070104 12070104 12070201	12070201 12070203 12070204 12070205	12080008 12080008 12090101 12090101	12090106 12090201 12090201 12090201	

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NIZA8 Rotqirəzəd	004	024 124 003 003		124 014 024 004	012 024 012	124 004	003 003 004	
DRAINAGE AREA	327.00	38400.00 51.30 321.00	. 5. 2	41380.00 727.00 817.00	289.00 1062.00 178.00	51 98 .00	21.20 41.80 3.26 9.54	
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LONGITUDE	0982819	0984010 0984010 0974139 097317 097317 097310	600	0960613 0955831 0955336 0964110	0964845 0963318 0963247 0963308 0962801	0963444 0982300 0970045 0983245	0983036 0982941 0983259 0983106	
LATITUDE		304504 304504 304440 301440 301659 301727	301559 301429 301349 291830 294222	291832 284113 291847 285735 284921	292800 290130 290934 290132 290117	285248 295140 284735 284734 284734	292956 292434 292729 293731	
STATION NAME AND LOCATION	SANDY CREEK NEAR KINGSLAND, TEX. BRAZOS R AT RICHMOND	LLAND R AT LLAND LLAND RIVER AT LLAND, TEX. CLORADD R AT AUSTIN COLORADD RIVER AT AUSTIN, TEX. WALNUT CREEK AT WEBBERVILLE RD. AUSTIN, TEX. ONION CREEK AT U.S. HWY. 183, NR AUSTIN, TEX PEDENALES R AT JOHNSON CITY RIG SANDY C ND MC DADE TX	BIG SANDY C NR ELGIN TX DOGWOOD CREEK NR MC DADE TX DOGWOOD CR AT HW95 N MC DADE T BRIDGE ON US 59 AT WHARTON COLORADO RIVER AT COLUMBUS, TEX.	COLORADO RIVER AT WHARTON, TEX. COLORADO RIVER AT MATAGORDA, TEX. SAN BERNARD RIVER NEAR BOLING, TEXAS LAVACA RIVER NEAR EDNA, TEXAS 4204101LAVACA-TRES PALACIOS ES LINE 041 SITE	NAVIDAD R NR HALLETSVILLE AT UPSTREAM BRIDGE ON US 59 SOUTHWEST OF GAN SANDY CREEK NEAR LOUISE, TEX. NAVIDAD RIVER NR GANADD, TEX. WEST MUSTANG CR NR GANADD, TEX.	4202002LAVACA-TRES PALACIOS ES LINE 20 SITE GUADALUPE R NR SPRING BRANCH GUADLUPE R AT VICTORIA GUADALUPE RIVER AT VICTORIA, TEX. OLMOS C TRIB AT FR 1535, SHAVANO PARK, TEX.	OLMOS CR AT DRESDEN DRIVE, SAN ANTONIO, TEX. SAN ANTONIO RIVER AT SAN ANTONIO, TEX. ALAZAN C AT ST. CLOUD ST, SAN ANTONIO, TEX. PANTHER SPG CR @ FR2696 NR SAN ANTONIO, TX(D	
HYDROLOGIC Unit Code	12090201 12090204	12090204 12090204 12090205 12090205 12090205 12090205 12090205	12090301 12090301 12090301 12090302 12090302	12090302 12090302 12090401 12100101	12100102 12100102 12100102 12100102	12100102 12100201 12100204 12100301	12100301 12100301 12100301 12100301	

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OW END RABY		1972	1975	1975	1968		1967	
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LONGITUDE	0982625 0982551 0982712 0982445	0983740 0983926 0984129 0983600 0972304	0980350 0974619 0975341 0972304	0975548 0964845 0971644 0973714 0991426	0983325 0981703 0982045 0982047	098 1702 0975 136 098 1045 098 1106 0980808	0974637 0974637 0975445	
LATITUDE	293136 293057 292638 292125	293514 293342 292312 283858 283854	285705 285512 284641 283858 290050	290050 285735 281730 281656 282532	281831 282516 282930 282931 283514	283718 280217 282545 282610 271551	261854 261854 260745	
STATION NAME AND LOCATION	SALADO CR TRIB AT BITTERS RD, SAN ANTONIO, T SALADO CREEK (UPPER STATION) AT SAN ANTONIO, SALADO C TRIB AT BEE ST, SAN ANTONIO, TEX.(D SALADO CREEK (LOWER STATION) AT SAN ANTONIO,	LEON CR TRIB AT FR 1604, SAN ANTONIO, TEX. FRENCH CR TRIB NR HELOTES, TEX. HELOTES CREEK AT HELOTES, TEXAS LEON CREEK TRIB AT KELLY AIR FORCE BASE, TEX SAN ANTONIO R AT GOLIAD BRIDGE ON US 77-A AND 183 SOUTHEAST OF GOLIA	SAN ANTONIO RIVER NEAR FALLS CITY, TEX. ECLETO CREEK NEAR RUNGE, TEX. ESCONDIDO CR SWS NO. 1 NR KENEDY, TEX. SAN ANTONIO RIVER AT GOLIAD, TEX. CIBDLO C NR FALLS CITY	CIBOLO CREEK NR FALLS CITY, TEX. LAVACA R NR EDNA MISSION RIVER AT REFUGIO, TEXAS ARANSAS RIVER NEAR SKIDMORE, TEX. NUECES R AT COTULLA	NUECES RIVER NEAR TILDEN, TEX. NUECES RIVER AT SIMMONS, TEX.(DISC) FRIO R AT CALLIHAM FRIO RIVER AT CALLIHAM, TEX. SAN MIGUEL CREEK NEAR TILDEN, TEX.	ATASCOSA RIVER AT WHITSETT, TEX. NUECES R NR MATHIS BRIDGE ON US 281 SOUTH OF THREE RIVERS NUECES RIVER NR. THREE RIVERS, TEX. LOS OLMOS CREEK NEAR FALFURRIAS, TEX.	NORTH FLOODWAY NR SEBASTIAN, TEX NORTH FLOODWAY NEAR SEBASTION, TEX. ARROYO COLORADO @ EL FUSTE SIPHON NR MERCEDE	
HYDROLOGIC Unit Code		12100302 12100302 12100302 12100303	12100303 12100303 12100303 12100303	12100304 12100402 12100406 12100407 12110105	12110105 12110105 12110108 12110108	12110110 12110111 12110111 12110111	12110208 12110208 12110208	

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OW END RA3Y		1977	1968 1975 1974	1975			1965 1969	1974 1973 1975 1974	
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BASIN DESCRIPTOR			024 124 004	014	0 4 4 4 4 4 4	014	004 014 124	014 004 024	
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LONGITUDE	EGI	0993125 0992940 0991005 0972715 1041740	1013330 1064416 1064904 1054522 1055429	1053023 1054020 1054105 1054128 1052250	1052844 1053404 1053312 1053842 1053840	1053924 1053905 1054134 1054230 1054106	1053455 1054514 1055749 1060830 1062459	1063757 1063930 1064018 1063734	
LATITUDE	_Щ	273125 272950 263325 293105	294800 373148 374126 370442	365801 364513 364405 363914 364025	364157 364212 364350 364134	364053 364107 363853 363206 363156	36 1752 36 19 12 36 1220 355229 36 14 12	363945 364815 365112 364431	
STATION NAME AND LOCATION	RIO GRAND	RIO GRANDE AT LAREDO WATER PLT TX RIO GRANDE AT LAREDO TX RIO GRANDE BL FALCON DAM TX RIO GRANDE NR BROWNSVILLE TX RIO GRANDE BL RIO CONCHOS NR PRES	RIO GRANDE AT LANGTRY TX NAVAJO RIVER BL OSO DIV DAM, NEAR CHROMO, CO LITTLE NAVAJO BL LITTLE OSO DIV DAM,CO RIO GRANDE NEAR LOBATOS, CO. RIO NAMBE AT NAMBE FALLS NR NAMBE NM	COSTILLA C NR COSTILLA, NM RIO GRANDE AT SHEEPS XING CAMPGROUND NR CERR RIO GRANDE NEAR CERRO, NM RIO GRANDE AB RED RIVER CONFLUENCE NR CERRO, RED RIVER BELOW ZWERGLE DAM SITE NR RED RIVE	RED RIVER AT MOLYCORPS MINE NR RED RIVER,NM RED RIVER NEAR QUESTA N. MEX. CABRESTO CREEK NEAR QUESTA, N. MEX. RED RIVER BL QUESTA,NM	RED R AT FISH HATCH NR QUESTA,NM RED RIVER BL FISH HATCHERY, NR QUESTA,NM RED RIVER AT MOUTH, NEAR QUESTA, N. MEX. RIO GRANDE ABOVE RIO HONDO AT DUNN BRIDGE,NM ARROYO HONDO AT ARROYO HONDO, N. MEX.	RIO GRANDE DEL RANCHO NEAR TALPA, N. MEX. RIO GRANDE BELOW TAOS JUNCTION BRIDGE NR TAO RIO GRANDE AT EMBUDO, N. MEX. RIO GRANDE AT OTOWI BRIDGE, NM RIO CHAMA BL ABIQUIU LK	RID CHAMA NEAR LA PUENTE, N. MEX. WILLOW CR ABV AZOTEA CR NR PARK VIEW N. MEX. AZOTEA TUNNEL AT OUTLET NEAR CHAMA, N. MEX. WILLOW CREEK ABOVE HERON RES NR PARK VIEW N.	
HYDROLOGIC Unit Code		130055 L 130055 L 130055 M 130055 M	130056 J 13010001 13010002 13020101	13020101 13020101 13020101 13020101	13020101 13020101 13020101 13020101	13020101 13020101 13020101 13020101	13020101 13020101 13020101 13020101	13020102 13020102 13020102 13020102	

			 						
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LONGITUDE		1064308 1064400 1064324 1063550	1062459 1060640 106 1650 106 1908 106 1926	106 1230 106 1257 106 1901 106 26 23 106 1945	1062010 1062113 1062116 1062116	1062127 1062139 1062142 1062139	1062204 1062229 1062226 1062252 1062255	1062352 1062348 1062404 1052433	
LATITUDE		363940 363539 363448 361906	361412 360426 354708 353756	352744 352756 353043 352639 353709	353616 353539 353454 353453 353453	353412 353331 353300 353300	353140 353140 353138 353103	353029 352951 352905 352315	
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STATION NAME AND LOCATION	c i	IO CHAMA BL HERON DAM, NM L VADO RESERVOIR NEAR TIERRA IO CHAMA BELOW EL VADO DAM, IO CHAMA AB ABIQUIU RE, NM	DAM, NM A,NM IN BANDE IN BANDE OAM, NM	R E 3	ISLETA ISLETA ISLETA ISLETA	ISLETA ISLETA ISLETA ISLETA ISLETA	ISLETA ISLETA ISLETA ISLETA ISLETA	ISLETA ISLETA ISLETA ISLETA	
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	- -	RIO CHAMA B EL VADO RES RIO CHAMA B RIO CHAMA A	CHAMA CHAMA DE LC GRANDE	GALISTEO RESERVOIR NEAR CER GALISTEO CREEK BELOW GALIST GALISTEO C AT DOMINGO, NM RIO GRANDE AT SAN FELIPE,NM RIO GRANDE COCHITI TO ISLET	GRANDE GRANDE GRANDE GRANDE GRANDE	GRANDE GRANDE GRANDE GRANDE GRANDE	GRANDE GRANDE GRANDE GRANDE GRANDE	GRANDE GRANDE GRANDE GRANDE	
		CK IN CK CK	RIO RIO RIO RIO	GAL GAL GAL RIO RIO	R10 R10 R10 R10	R10 R10 R10 R10	R10 R10 R10 R10	R10 R10 R10	
HYDROLOGIC Unit Code		13020102 13020102 13020102	13020102 13020102 13020201 13020201	13020201 13020201 13020201 13020201	13020201 13020201 13020201 13020201	13020201 13020201 13020201 13020201	13020201 13020201 13020201 13020201	13020201 13020201 13020201 13020201	

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LONGITUDE	1062506 1062550 1062550 1062716	1062833 1062829 1062858 1062951 1062954	1063106 1063100 1063215 1063145	1063237 1063203 1063108 1063144 1063545	1063416 1064048 1064104 1064811 1064800	1064800 1064915 1065343 1065404 1065318	1065940 1065930 1064343 1063058	
LATITUDE	352738 352714 352563 352509	352305 352349 352316 352249 352249	352227 352151 352105 352310	352340 352324 352227 351850 351705	350804 350521 345421 342452 342500	342501 342456 341517 341454 341523	334107 334050 341715 352151	
STATION NAME AND LOCATION	RIO GRANDE COCHITI TO ISLETA X-SECTION 15,NM SRIO GRANDE COCHITI TO ISLETA X-SECTION 16,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 18,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 19,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 20,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 20,NM	RIO GRANDE COCHITI TO ISLETA X-SECTION 21W.N STO GRANDE COCHITI TO ISLETA X-SECTION 21E.N SRIO GRANDE COCHITI TO ISLETA X-SECTION 22.NM RIO GRANDE COCHITI TO ISLETA X-SECTION 23W.N SRIO GRANDE COCHITI TO ISLETA X-SECTION 23W.N SRIO GRANDE COCHITI TO ISLETA X-SECTION 23E.N	RIO GRANDE COCHITI TO ISLETA X-SECTION 24W,N SRIO GRANDE COCHITI TO ISLETA X-SECTION 25E,N SRIO GRANDE COCHITI TO ISLETA X-SECTION 27,NM DIVERSION SAN JUAN TO RIO GRANDE CHEZ CANY DAM N MEX	JEMEZ R BL JEMEZ CANYON DAM JEMEZ RIVER BELOW JEMEZ CANYON DAM,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 24E,N PIEDRA LISA ARROYO NR BERNALILLO N M RIO GRAND NR BERNALILLO N M	VILLA DEL OSO DRAIN AT ALBUQUERQUE, NM RIO GRANDE AT ALBUQUERQUE, N. MEX. RIO GRANDE NEAR ISLETA,NM RIO GRANDE CONVEYANCE CHANNEL NEAR BERNARDO, S	RIO GRANDE FLOODWAY NEAR BERNARDO, NM BERNARDO INTERIOR DRAIN NR BERNARDO,N. M. SOCORRO MAIN CANAL NORTH AT SAN ACACIA, NM RIO GRANDE CONVEYANCE CHANNEL AT SAN ACACIA, RIO GRANDE FLOODWAY AT SAN ACACIA, NM	RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL RIO GRANDE FLODDWAY AT SAN MARCIAL, NM TORTUGAS ARROYO NR LAS CRUCES, N MEX RIO GRANDE COCHITI TO ISLETA X-SECTION 25W,N	
HYDROLOGIC UNIT CODE	13020201 13020201 13020201 13020201 13020201	13020201 13020201 13020201 13020201	13020201 13020201 13020201 13020201	13020202 13020202 13020202 13020203	13020203 13020203 13020203 13020203	13020203 13020203 13020203 13020203	13020203 13020203 13020203	

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DRAINAGE AREA			12.80 1390.00 6590.00 7350.00	201.00 3660.00 1380.00 29450.00	28680.00 29267.00 29267.00	97.30 184.00 31944.00 67760.00	80742.00 35200.00 3961.00 120.00
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3TAT2	035 035 035 035	035 035 035 035	035 035 035 035	035 035 035 035	048 048 035 035	035 035 048 048	0 4 8 8 9 0 0 0 8 8 9 0 0 0 0 0 0 0 0 0 0 0
LONGITUDE	1063110 1063243 1063323 1063412	1063540 1063548 1063736 1064010 1064021	1064110 1065644 1071119 1065920 1065109	1072458 1080640 1071111 1065359 1071222	1063617 1063225 1063225 1083158 1074903	1075507 1080055 1075823 1053625 1032330	1014520 1012645 1010000 1055350
LATITUDE	352125 352024 351938 351823	351712 351551 351223 350928 350143	345732 355655 353533 344738	355336 351731 345805 341750 330854	315732 314810 314810 330216 325424	324805 325614 325117 310505 290205	294650 294810 294100 333341
STATION NAME AND LOCATION	RIO GRANDE COCHITI TO ISLETA X-SECTION 26,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 28,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 29,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 30,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 31,NM	RIO GRANDE COCHITI TO ISLETA X-SECTION 32,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 33,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 34,NM RIO GRANDE COCHITI TO ISLETA X-SECTION 35,NM RID GRANDE COCHITI TO ISLETA X-SECTION 37,NM	RIO GRANDE COCHITI TO ISLETA X-SECTION 38,NM SAN PABLO CR NR CUBA, NM ARROYO CHICO NR GUADALUPE N M RIO PUERCO AT RIO PUERCO, NEW MEXICO RIO PUERCO NEAR BERNARDO,NM	PAPERS WASH NR STARLAKE TRADING POST, NM BLUEWATER LK NR BLUEWATER N M RIO SAN JOSE AT CORREO N M RIO SALADO NEAR SAN ACACIA,NM RIO GRANDE BELOW ELEPHANT BUTTE DAM, NM	RIO GRANDE AT VINTON BR NR ANTHONY,TX RIO GRANDE AT EL PASO, TEX. RIO GRANDE AT EL PASO TX GILA RIVER ABOVE CLIFF NM GALLINAS CR BELOW IRON CREEK	MIMBRES RIVER BELOW SAN LORENZO MIMBRES R AT MCKNIGHT DS NR MIMBRES N M MIMBRES RIVER AT MIMBRES NM RIO GRANDE AT FORT QUITMAN, TEXAS RIO GRANDE AT JOHNSON RANCH TX	RIO GRANDE AT FOSTER RANCH NR LANGTRY, TEXAS PECOS RIVER NEAR LANGTRY, TX DEVILS RIVER AT PAFFORD CROSSING NR COMSTOCK RIO TULAROSA NEAR 35NT, NM
HYDROLOGIC Unit Code	13020203 13020203 13020203 13020203 13020203	13020203 13020203 13020203 13020203	13020203 13020204 13020204 13020204	13020205 13020207 13020207 13020209 13030101	13030102 13030102 13030201 13030201	13030202 13030202 13030202 13040201	13040212 13040212 13040302 13050003

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BASIN DESCRIPTOR	4 + 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4100 4100 4100	014	124	
DRAINAGE AREA	53.20 1050.00 2650.00 3970.00 4390.00	15300.00 947.00 1060.00 18100.00	19540.00 35162.00 123303.00 132578.00	176304.00	
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3TAT2	035 035 035 035	035 035 035 035 035	035 048 048 048 048	048 048 048 048	
LONGITUDE	1053927 1050630 1044155 1043128	1041923 1045105 1042449 1041301 1040134	1040221 1012435 1005540 0992940 0984820	0983400 0974340 0982005 0972715	
LATITUDE	354638 351044 345636 343631	325025 332057 324436 322440 321324	320430 294920 291935 272950	261425 260200 260800	
STATION NAME AND LOCATION	RIO MORA NEAR TERRERO, NM PECOS RIVER NEAR ANTON CHICO, NM PECOS RIVER AT SANTA ROSA, NM PECOS RIVER NEAR PUERTO DE LUNA, NM PECOS RIVER BELOW SUMNER DAM, NM	PECOS RIVER NEAR ARTESIA, NM RIO HONDO AT DIAMOND A RANCH NR ROSWELL N M RIO PENASCO AT DAYTON N M PECOS RIVER AT CARLSBAD, NM PECOS RIVER NEAR MALAGA, NM	PECOS RIVER AT RED BLUFF, NM PECOS RIVER NR SHUMLA TX RIO GRANDE NR DEL RIO TX RIO GRANDE AT LAREDO, TEX. RIO GRANDE AT FORT RINGGOLD TX	RIO GRANDE NR LOS EBANOS TX RIO GRANDE NR SAN BENITO TX RIO GRANDE BL ANZALDUAS DAM TX RIO GRANDE NEAR BROWNSVILLE, TEXAS	·
HYDROLOGIC UNIT CODE	13060001 13060001 13060001 13060001	13060007 13060008 13060010 13060011	13060011 13070008 13080001 13080002	13090001 13090002 130955 M	

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MIZAB Rotqirəz30			124 004 124		014		004	024	
DRAINAGE AREA	Z 		323.00 76.00 19.00 2382.00	4394.00	21.00		19.60 55.00 844.00	167.00 26.80 1451.00	
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LATITUDE		393730 394744 394722 401000	395000 400715 400927 400941 400212	393840 393300 395659 395957 400454	400559 393001 395249 392546	393736 393944 394647 394957 394305	393724 393835 393900 393045 393857	394240 391356 391947 393237	
STATION NAME AND LOCATION	UPPER COLO	VERMILLION CREEK NEAR HIAWATHA COLO COTTONWOOD NR DOTSERO SOUTH FORK WILLIAMS FORK WILLIAMS FORK ABV DARLING CK.	WILLIAMS FK BI. KINNEY CR ATLEAL COLORADO RIVER NEAR GRANBY, CO. EAST FORK TROUBLESOME C NEAR TROUBLESOME, CO RED DIRT CREEK NEAR KREMMLING, CO. COLORADO RIVER NEAR KREMMLING, CO.	COLORADO RIVER NEAR DOTSERO, CO. COLORADO RIVER AT GLENWOOD SPRINGS, CO. ST LOUIS CR ABV FRASER RANCH CR NR TABERNASH FRASER R ABV GRANBY STP NR GRANBY	FRASER R AT CONFLUENCE WITH COLORADO R WEST TENMILE CREEK AT COPPER MOUNTAIN, CO. BLUE RIVER BELOW GREEN MOUNTAIN RESERVOIR, C BLUE R AT BLUE R ABV GOOSE PASTURE TARN SWAN R AT MOUTH NR FRISCO	STRAIGHT CR AT MOUTH NR FRISCO BLUE R NR SILVERTHORNE BLUE R ABV PASS CR BLW SIERRA BOSQUE BLUE R BLW SIERRA BOSQUE MILK CREEK NR CASTLE PEAK	BLACK GORE CREEK NEAR VAIL, CO. GORE CREEK AT VAIL, CO. EAGLE RIVER AT GYPSUM, CO. EAST BRUSH CR AT YEOMAN PARK NR GYPSUM CR AT MOUTH NR GYPSUM	MILK CR. AT MOUTH, NR. WOLCOTT CRYSTAL RIVER AB AVALANCHE C, NEAR REDSTONE, NORTH THOMPSON CREEK NEAR CARBONDALE, CO. ROARING FORK RIVER AT GLENWOOD SPRINGS, CO.	
HYDROLOGIC UNIT CODE		140064 J 14010001 14010001 14010001	14010001 14010001 14010001 14010001	14010001 14010001 14010001 14010001	14010001 14010002 14010002 14010002	14010002 14010002 14010002 14010003	14010003 14010003 14010003 14010003	14010003 14010004 14010004	

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BASIN DESCRIPTOR		000 424 424	024	024 124 024 124	124	014 124 124	0000 4 4 4 4	
DRAINAGE AREA		64.60 7370.00 80.40 17764.00	12.60 22.10 20.40 141.00 198.00	321.00 66.60 43.70 531.00	39.50 7928.00 1129.00	4580.00 504.00 40.60 53.00 1069.00	24100.00 2.90 16.80 74.90	
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LONGITUDE	1064628 1071426 1071426		1080044 1080146 1080114 1080637 1080333	1081859 1073239 1073022 1071611 1072653	1075514 1082700 1075814 1075640 1080449	1091140 1083015 1081142 1081938 1083357	1091734 1091516 1091852 1093048	
LATITUDE	390820 391051 391053	92032 92103 91952 92145 91502	393713 393715 393403 393401	392712 381545 384340 385718	385406 385900 383126 382332 384431	384750 372816 375812 375833 381304	384838 384144 384223 383344	
STATION NAME AND LOCATION	DIFFICULT CREEK NR. MOUTH AT DIF CRYSTAL R ABV COAL CR NR REDSTONE COAL CR BL MIDCONTINENT AT REDSTONE	ROARING FORK R. BLW SNOWMASS SOPRUS CR ABV CONFLUENCE NR BASALT WEST DIVIDE CREEK NEAR RAVEN, CO. COLORADO RIVER NEAR DE BEOUE, CO. PLATEAU CREEK NEAR COLLBRAN, CO. COLORADO RIVER NEAR COLCRADO-UTAH STATE LINE	NORTHWATER CREEK NEAR ANVIL POINTS, CO. EAST MIDDLE FORK PARACHUTE CR NR RIO BLANCO, EAST FORK PARACHUTE CREEK NEAR RULISON, CO. PARACHUTE CREEK NEAR GRAND VALLEY, CO. PARACHUTE CREEK AT GRAND VALLEY, CO.	ROAN CREEK NEAR DE BEQUE, CO. CIMARRON RIVER NEAR CIMARRON, CO. SMITH FORK NEAR CRAWFORD, CO. ANTHRACITE CREEK NEAR SOMERSET, CO. NORTH FORK GUNNISON RIVER NEAR SOMERSET, CO.	SURFACE CREEK AT CEDAREDGE, CO. GUNNISON RIVER NEAR GRAND JUNCTION, CO. SPRING CREEK NEAR BEAVER HILL, CO. SPRING CREEK NEAR MONTROSE, CO. UNCOMPAHGRE RIVER AT DELTA, CO.	DOLORES RIVER NEAR CISCO,UT. DOLORES RIVER AT DOLORES, CO. BEAVER CREEK NEAR NORWOOD, CO. WEST NATURITA CREEK NEAR NORWOOD, CO. SAN MIGUEL RIVER AT NATURITA, CO.	COLORADO RIVER NEAR CISCO UTAH ONION CR AB ON CR BR NR MOAB ONION CR B ON CR BR NR MOAB UT MILL CR NR MOAB UTAH	
HYDROLOGIC Unit Code	14010004 14010004 14010004	14010004 14010005 14010005 14010005 14010005	14010006 14010006 14010006 14010006	14010006 14020002 14020002 14020004	14020005 14020005 14020006 14020006	14030001 14030003 14030003 14030003	14030005 14030005 14030005	

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DRAINAGE AREA	468.00 43.00		75.80 79.20	45.40 2.77 1230.00	4280.00 14.20 16.60 7300.00 15.70	94.00 322.00 134.00	500.00 1610.00 1720.00	
TYPE OF SITE	AS AS		3 3 3 3 S	3 X X X X X X X X X X X X X X X X X X X	33 3 3 3 S	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N	
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LONGITUDE	1100703	1095658 1100635 1101509 1101910 1100945 1102457	1094850 1095820 1103640 1094610 1092500	1093100 1093723 1095546 1095300 1094600	1100257 1095940 1094403 1094405	1094644 1094645 1091700 1092906 1091844	1091900 1093457 1094104	-
LATITUDE	430108 425640	423325 422328 422335 423330 421320 421134 420546	423220 423220 425859 430150 424000	424500 423507 423402 423600 424002	420116 420309 414704 414355	415052 415125 423500 421901 421412	420800 420037 415643	
STATION NAME AND LOCATION	GE, NEAR DANIEL, W	CACEC NEAR DIG PINEY, WYO. (SIN C NR BIG PINEY, WYO. (SIN C NR BIG PINEY, WYO. REC CR NR LA BARGE MEADOWS RANGER STA. RECREEK NEAR VIOLA, WYO. WOELLE CR NR HERSCHLER RANCH, NR FONTENE	BUCKHORN C AT LOWER FARSON CUTOFF WY ALKALI C NR BIG PINEY WY N HORSE CR AB MULE CR NR SHERMAN RANGER STAT PINE CREEK ABOVE FREMONT LAKE, WYO. EAST FORK RIVER NEAR BIG SANDY, WYO.	SILVER CREEK NEAR BIG SANDY, WYO. SAND SPRINGS DRAW TR NR BOULDER WY NEW FORK RIVER NEAR BIG PINEY, WYOMING TR TO NEW FORK R NR BIG PINEY WY	GREEN R BEL FONTENELLE RES WYO FOURMILE GULCH TR NR FONTENELLE WY E OTTERSON WASH NR GREEN R WY GREEN RIVER AT BIG ISLAND, NEAR GREEN RIVER. SKUNK CANYON C NR GREEN R WY	EIGHT MI C AT FREEZEOUT ISLAND WY BIG SANDY R AT MOUTH NR LITTLE COLO DESERT W BIG SANDY RIVER AT LECHIE RANCH NR. BIG SAND BIG SANDY CREEK NEAR FARSON, WYOMING LITTLE SANDY CREEK ABOVE EDEN, WYO.	PACIFIC C NR FARSON WY PACIFIC C NR FARSON WY BIG SANDY RIVER BELOW EDEN WYO BIG SANDY R AT GASSON BRIDGE, NR EDEN, WYO.	
HYDROLOGIC Unit Code	14040101	14040101 14040101 14040101 14040101 14040101	14040101 14040101 14040101 14040102	14040102 14040102 14040102 14040102	14040103 14040103 14040103 14040103 14040103	14040103 14040103 14040104 14040104	14040104 14040104 14040104 14040104	

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ORGANIZATION GODE	USGS USGS USGS USGS USGS	USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	1565 1565 1565 1565	
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BASIN DESCRIPTOR		004 004	0000 4 4 4 4 4	88888 44444	88888 44444			
DRAINAGE Area		308.00 152.00	759.00 836.00 34.70 22.00 4.92	13.10 35.90 3.69 19.50 7.88	18.20 515.00 526.00			
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3TAT2	056 056 056 056 056	056 056 056 056 056	056 056 056 056 056	056 056 056 056 056	056 056 056 056 056	056 056 056 056 056	056 056 056 056	
LONGITUDE	1085510 1085840 1085840 1085910 1085940	109 1400 109 1240 109 1240 108 304 7 108 44 10	1084710 1085950 1085952 1090259 1090429	1090302 1090306 1085456 1085350 1085630	1085817 1085800 1085918 1091815 1092249	1085815 1085800 1085920 1085700 1090156	1090421 1090602 1085330 1085740	
LATITUDE	420205 420630 420630 420640 420650	421040 421140 421200 412935 414030	414040 413852 411156 411156	4111232 411302 411302 411857 412720	412854 412900 413750 413300 413158	410515 410630 410722 410730 411003	411038 411055 411352 411618	
STATION NAME AND LOCATION	JACK MORROW C SITE A JACK MORROW C SITE B PARNELL C SITE C JACK MORROW C AB ROCK CABIN C NR FARSON WY ROCK CABIN C AT MOUTH NR FARSON WY	JACK MORROW C AT MOUTH NR FARSON WY PACIFIC C AB JACK MORROW C NR FARSON WY N PACIFIC C NR FARSON WY BITTER CREEK NEAR BITTER CREEK, WYO DEADMAN WASH NR POINT OF ROCKS WYO	BITTER CR NR POINT OF ROCKS WYO BITTER C AB SALT WELLS C NR SALT WELLS WY SALT WELLS C NR S BAXTER WY GAP C AB BEANS SP C NR S BAXTER WY BEAN SPRING CR NR SOUTH BAXTER, WY	BEAN SPRING CR NR SOUTH BAXTER, WY GAP CREEK NEAR SOUTH BAXTER WYOMING DRY CANYON C NR SOUTH BAXTER WY BIG FLAT DRAW NR ROCK SPRINGS WY CUTTHROAT DRAW NR ROCK SPRINGS WY	NO NAME C NR ROCK SPRINGS WY SALT WELLS CR NR ROCK SPRINGS WYO SALT WELLS CREEK NEAR SALT WELLS WY BITTER CR BEL LITTLE BITTER CR NR KANDA WYO BITTER C TR NR GREEN R WY	SALT WELLS C AT SITE X SALT WELLS C AT SITE A ALKALI C AT MOUTH NR S BAXTER WY SALT WELLS C AT SITE B GAP C NR RED SPRINGS RANCH WY	LITTLE BASIN C AT MOUTH NR SOUTH BAXTER WY LITTLE BASIN C TRIB DRY CANYON CR AB PIO RESERVOIR NR S BAXTER W SALT WELLS C AB GAP C NR S BAXTER WY	
HYDROLOGIC Unit Code	14040104 14040104 14040104 14040104 14040104	14040104 14040104 14040105 14040105	14040105 14040105 14040105 14040105	14040105 14040105 14040105 14040105	14040105 14040105 14040105 14040105	14040105 14040105 14040105 14040105	14040105 14040105 14040105 14040105	

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OW BEGIN	1976 1976 1976 1976	1976 1976 1976 1976	1976 1976 1976 1950	1975 1975 1969 1979	1951 1955 1971 1978	1978 1975 1976 1976	1978 1976 1976	
BASIN DESCRIPTOR			124	0004 0004 0114 124	124			
DRAINAGE AREA		-	14000.00	6.57 13.00 56.00 52.80	520.00 15100.00 140.00			
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YTMUOD	037 037 037 037	00000	041 041 037 037	037 037 041 041	037 009 009 037 037	037 037 037 037 037	037 037 037 037	
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LONGITUDE	1085835 1085644 1085647 108545	1082317 1082704 1082707 1083442 1084037	1083919 1083715 1092654 1092617	1093634 1093705 1101613 1100356	1094020 1092520 1091412 1091305 1090453	1093100 1093009 109340 1092133 1093053	1093730 1091659 1092657 1092828	
LATITUDE	411622 411639 411639 411858 412186	412437 412637 412640 413200 413206	413355 413402 413530 413059 412946	411014 410340 410023 405647	410045 405430 405811 410114 410330	410915 410927 411040 411255 411505	411510 411648 411657 411740	
STATION NAME AND LOCATION	DANS CREEK NR SOUTH BAXTER WY DRY CANYON AT MOUTH NR SOUTH BAXTER WY SALT WELLS C BELOW DRY CANYON C NR S. BAXTER SALT WELLS C AT SITE F PRETTY WATER CR AT MOUTH NR S BAXTER WY	IRON PIPE DRAW AT FORT LA CLED BITTER C AB ANTELOPE C NR FORT ANTELOPE C AT MOUTH NR FORT LA BITTER C BL PATRICK DRAW NR BI BITTER C AT BLACK BUTTES STAGE	RYCKMAN C AT MOUTH NR ELKOL,WY L MUDDY C AB RYCKMAN C NR ELKOL,WY SALT WELLS CR AT IRON CULVERT NR ROCK SPRING GREEN R. NR GREEN RIVER, WYO. GREEN RIVER BELOW GREEN RIVER WYO	SQUAW HOLLOW NEAR BURNTFORK, WY GREEN R TR NO 2 NR BURNTFORK WY HENRYS FORK NEAR LONETREE, WYO. MF BEAVER C AT UTAH WHO ST LINE BURNT FORK NEAR BURNTFORK, WYO.	HENRYS FORK NEAR LINWOOD UT GREEN RIVER NEAR GREENDALE, UTAH RED CREEK NEAR DUTCH JOHN,UTAH RED C NR RICHARDS GAP,WY RED C NR RED C RANCH, WY	WASHAM WASH AT MOUTH AT FLAMING GORGE RE WY UPPER MARSH C NR ROCK SPRINGS WYO SQUAW HOLLOW NR MOUTH AT FLAMING GORGE RE WY CURRANT C AB CURRANT C RANCH WYO CURRANT CR NR MOUTH NR MCKINNON JUNCTION WY	BUCKBOARD WASH AT MOUTH AT FLAMING GORGE RESAGE C AB SAGE C RANCH NR SHEEP MOUNTAIN, WYO SAGE C BL SAGE C RANCH NR GREASEWOOD DRAW, WY SAGE C MR ROCK SPRINGS WYO	
HYDROLOGIC Unit Code	14040105 14040105 14040105 14040105	14040105 14040105 14040105 14040105	14040105 14040105 14040105 14040106	14040106 14040106 14040106 14040106	14040106 14040106 14040106 14040106	14040106 14040106 14040106 14040106	14040106 14040106 14040106	

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LONGITUDE	1103438 1103443 1102352 1102843 1102537	1101214 1101112 1101020 1104234 1095928	1095611 1094134 1094536 1093720 1093655	1093605 1093840 1101325 1104239 1103409	1103155 1084410 1103342 1101343 1103627	1103740 1103738 1102950 1101812 1103533	1101624 1104018 1103404 1103400	
LATITUDE	405753 410154 410315 410120 410840	412231 412305 412708 420638 413556	413204 413246 413237 412735 412530	412440 412225 411432 413827 414351	415016 414030 413454 413217 411548	411747 411748 412522 413228 413258	413316 413452 413459 413513	
STATION NAME AND LOCATION	BLACKS FORK NEAR ROBERTSON, WYD. BLACKS FORK NEAR MILLBURNE, WYO. EAST FORK OF SMITH FORK NR ROBERTSON, WYO. WEST FORK OF SMITH FORK NR ROBERTSON, WYO. SMITHS FORK NR ROBERTSON, WYO.	SMITHS FORK NEAR LYMAN, WY MUD SPRING HOLLOW NR CHURCH BUTTE NR LYMAN W BLACKS FK NR LYMAN WYO HAMS FORK BL POLE CR, NR FRONTIER, WYO. HAMS FORK NEAR GRANGER, WYO.	BLACKS F TR NR GRANGER WY BLACKS FORK RIVER NEAR LITTLE AMERICA WYO MEADOW SPRINGS WASH TR NR GREEN R BLACKS FORK TRIB NO 2 NR GREEN RIVER WYO BLACKS F TR NO 3 NR GREEN R WY	BLACKS F TR NO 4 NR GREEN R WY SUMMERS DRY C NR GREEN RIVER WY LEAVITT C NR MOUTAIN VIEW WY L MUDDY C AB WARFIELD C NR ELKOL, WY N F L MUDDY C TRIB NO. 2 NR ELKOL, WY	WILLOW C AT MOUTH NR FRONTIER, WY DEADMAN WASH NR POINT OF ROCKS WYO LITTLE MUDDY C NR GLENCOE WY MUDDY CREEK NEAR HAMPTON WYO MUDDY C NR PIEDMONT WY	ANTELOPE C AT MOUTH, NR LEROY, WY MUDDY C AB SODA HOLLOW, NR LEROY, WY MUDDY C AB ROCK C NR CARTER, WY MUDDY C AT HAMPTON, WY ALBERT C BL WHITNEY C NR CUMBERLAND GAP, WY	L MUDDY C NR MOUTH NR HAMPTON, WY L MUDDY C AB BELL C NR ELKOL, WY L MUDDY C AB N F NR GLENCO, WY N F L MUDDY C AT MOUTH NR GLENCO, WY	
HYDRDLOGIC Unit Code	14040107 14040107 14040107 14040107	14040107 14040107 14040107 14040107	14040107 14040107 14040107 14040107	14040107 14040107 14040107 14040107	14040107 14040108 14040108 14040108	14040108 14040108 14040108 14040108	14040108 14040108 14040108 14040108	

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LONGITUDE	1104217	1103336 1104810 1104808 1103313 1103323	1103345 1103405 1083839 1084333 1083825	1083840 1085853 1085730 1084721 1084720	1085214 1082533 1073227 1073220	1073328 1080726 1072912 1072729	1072556 1072851 1072851 1072851	
LATITUOE	413648 413648 413740		414333 414351 410054 404543 410130	4 10 130 4 10 4 17 4 10 4 18 4 10 5 19 4 10 5 20	410626 410917 413752 414122 413752	413938 413818 413239 413349 413404	413507 413731 413731 413731	
STATION NAME AND LOCATION	L MUDDY C AE SHEEP C AT N	N F L MUDDY C NR ELKOL WY WARFIELD C AT MOUTH NR ELK CHICKEN C AB ROAD HOLLOW N ROAD HOLLOW AT MOUTH NR EL NF LITTLE MUDDY C TRIB AT N F L MUDDY C AT BLAZON JU NF LITTLE MUDDY C TRIB NR NF LITTLE MUDDY C TRIB NR	NF LITTLE MUDDY C TRIB NR ELKOL, WY N F L MUDDY C TRIB ND. 1 NR ELKOL,WY VERMILLION CREEK NEAR HIAWATHA COLO VERMILLION CREEK AT INK SPRINGS RANCH, CO.	VERMILLION C AB ALKALI C, NR HIAWATHA, COLO SALT WELLS C BL PINE LK NR S BAXTER WY NF VERMILLION C NR PINE MTN WY COYOTE C AT MOUTH NR HIAWATHA CO	MF VERMILLION C NR RIFE RANCH WY SHELL C AB COW C RE SEPARATION C AT UP STA NR RINER WY SEPARATION C NR RINER WY SEPARATION C AT UPPER STA NR RINER	SEPARATION C NR RINER WYO DELANEY DRAW NR RED DESERT WYO SITE S-10 SITE S-8	SITE S-6 SITE S-20A SITE S-20B SITE S-20C	
HYDROLOGIC Unit Code	14040108 14040108 14040108	14040108 14040108 14040108 14040108 14040108 14040108	14040108 14040108 14040109 14040109	14040109 14040109 14040109 14040109	14040109 14040109 14040200 14040200	14040200 14040200 14040200 14040200	14040200 14040200 14040200 14040200	

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LONGITUBE	1073336 1073323 1073340 1073040 1073201	1072815 1072652 1081832 1080730 1081830	1080707 1082209 1082209 1080700 1082500	1082500 1083630 1083300 1083300 1072850	1080620 1080628 1083530 1080515 1073318	1082730 1080350 1080350 1065500 1065500	1070700 1070400 1070200 1070100	
LATITUDE	413753 413937 413940 414106	414515 414637 420225 420425 420438	420604 420823 420823 420848 420915	420915 421015 421020 421020	421255 421300 421300 421310	421403 421438 421440 405800	400200 400300 400400	
STATION NAME AND LOCATION	SITE S-27 SEPERATION C RILL A2R BL GAGE NR RINER WY SEPARATION CR RILL AIL BL GAGE NR RINER WY LARSON DRAW NR COMMAND CENTER SITE S-32	SITE S-39 SITE S-41 RED C AB HAY RES LOST C BL EAGLES NEST SPRING NR BAIROIL WY BUSH C AT MOUTH	LOST C AB EAGLES NEST SPRING RED C AT ROCKY CROSSING RED C TRIB AT ROCKY CROSSING LOST C AT GOODFORD CROSSING RED C TRIB NR 5-FINGERS BUTTE	RED C NR FIVE FINGERS BUTTE BEAR C NR HONEYCOMB BUTTE BEAR C AB NORTH FORK BEAR C NORTH FORK BEAR C AT MOUTH LOST SOLDIER C NR LOST SOLDIER LAKE	LOST C AB BIG BEND LOST C TRIB AB BIG BEND RED C AT FOOTHILLS LOST C BL ARAPAHOE C LOST SOLDIER C NR BAIROIL	RED C AT CYCLONE RIM LOST C AB ARAPAHOE C LOST C TRIB AB ARAPAHOE C WHISKEY CREEK 9MI N COLUMBINE M FK LITTLE SNAKE NR COLUMBINE	BEAR RIVER #1,14 MI SW YAMPA COL BEAR RIVER #2,13 MI SW YAMPA COL BEAR RIVER #3,10 MI SW YAMPA COL FLOYD CREEK ABV. FRST BDRY	
HYDRDLOGIC Unit Code	14040200 14040200 14040200 14040200	14040200 14040200 14040200 14040200	14040200 14040200 14040200 14040200	14040200 14040200 14040200 14040200	14040200 14040200 14040200 14040200	14040200 14040200 14040200 14050001 14050001	14050001 14050001 14050001 14050001	

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LONGITUBE	1064915 1064954 1065319 1065712 1065933	1070504 1065939 1070933 1071447	1071712 1072608 1073034 1073310 1073623	1073850 1065248 1065622 1065022 1065756	1065746 1064716 1073652 1065000	1065827 1064936 1064815 1064710 1065054	1073218 1073142 1071913 1064929	
LATITUDE	402755 402901 403356 403053 402308	402045 402325 402918 402806 404011	404050 403152 402950 402945 402904	402614 400612 401418 401634 401725	401741 402056 402221 402356 402530	402536 402544 402720 402802 402934	403038 403251 403530 404506	
STATION NAME AND LOCATION	FISH CREEK NEAR STEAMBOAT SPRING YAMPA RIVER AT STEAMBOAT SPRINGS, CO. MAD CREEK NEAR STEAMBOAT SPRINGS ELK RIVER NEAR TRULL, CO. MIDDLE CREEK NEAR OAK CREEK, CO.	FOIDEL CREEK NEAR DAK CREEK, CO. FOIDEL CREEK AT MOUTH, NEAR DAK CREEK, CO. YAMPA RIVER BELOW DIVERSION, NEAR HAYDEN, CO. STOKES GULCH NEAR HAYDEN, CO. ELKHEAD CREEK NEAR ELKHEAD, CO.	NORTH FORK ELKHEAD CREEK NEAR ELKHEAD, CO. ELKHEAD CREEK NEAR CRAIG, CO. YAMPA RIVER BELOW ELKHEAD CREEK NEAR CRAIG. YAMPA RIVER AT CRAIG, CO. YAMPA RIVER BELOW CRAIG, CO.	WILLIAMS FORK AT MOUTH, NEAR HAMILTON, CO. CHIMNEY CREEK AT TRAPPER, CO. YAMPA RIVER AT PHIPPSBURG, CO. LITTLE MORRISON CREEK NEAR STAGE OAK CREEK AB OAK CREEK DRAIN NEA	DAK CREEK ABOVE ROUTT, CO. HARRISON CREEK AT MOUTH NR BLACK WILLIAMS FORK BL MORAPOS CREEK A YAMPA RIVER AB DAK CREEK NR STEA FISH CREEK AT MOUTH NEAR MILNER,	TROUT CREEK BELOW FOIDEL CREEK NY YAMPA RIVER BELOW OAK CREEK NR S BURGESS CREEK BL SKI AREA NR STE BURGESS CREEK AB SKI AREA NR STE YAMPA RIVER AB SEWAGE PLANT BL S	FORTIFICATION CREEK BELOW CRAIG, FORTIFICATION CREEK ABOVE CRAIG, ELKHEAD CREEK ABOVE ELKHEAD RESE ELK RIVIZ BILDY SOUTH FORK AT HI	
HYDROLOGIC Unit Code	14050001 14050001 14050001 14050001	14050001 14050001 14050001 14050001	14050001 14050001 14050001 14050001	14050001 14050001 14050001 14050001	14050001 14050001 14050001 14050001	14050001 14050001 14050001 14050001	14050001 14050001 14050001 14050001	

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LATITUBE	404620 401725 401848 401848	403010 401601 402154 405600 405800	410055 405958 410800 410012 405854	411305 410552 410120 410142 405456	410011 403627 403627 403250 405855	410154 410229 410231 410740 411036	411134 412024 410755	
STATION NAME AND LOCATION		YAMPA RIVER NEAR MAYBELL, CO. STINKING GULCH NEAR THRONBURGH, MILK CREEK NEAR MOUTH NEAR AXIAL MIDDLE FK LITTLE SNAKE NR COLUMB WHISKEY CR,9 MI NO COLUMBINE	NF L SNAKE R NR SLATER COLO LITTLE SNAKE RIVER NEAR SLATER, CO. BATTLE C NR ENCAMPMENT WYO BATTLE CREEK NEAR SLATER, CO. SLATER FORK NEAR SLATER, CO.	SAVERY CREEK AT UPPER STATION, NEAR SAVERY. SAVERY CREEK NEAR SAVERY, WY. SAVERY CREEK AT SAVERY, WY. LITTLE SNAKE RIVER NEAR DIXON, WY. WILLOW CREEK NEAR DIXON, WY.	LITTLE SNAKE RIVER NEAR BAGGS, WY. LITTLE SNAKE AB LILY COLO LITTLE SNAKE RIVER ABOVE LILY, CO. LITTLE SNAKE RIVER NEAR LILY, CO. WHISKEY CREEK AB WHISKEY PARK NR COLUMBINE,	POISON DRAW,NR BAGGS,WY SAND CREEK,NR BAGGS,WY RED C TRIB TO SD C NR BAGGS WY COTTONWOOD CR NR BAGGS WY SAND C NR PREHISTORIC RIM, WY	SKULL CREEK TRIB SD CK MUDDY C AB DRY COW C NR BAGGS WY DRY COW C NR BAGGS WY MUDDY CREEK ABOVE BAGGS, WY.	
HYDROLOGIC Unit CODE	14050001 14050002 14050002 14050002		14050003 14050003 14050003 14050003	14050003 14050003 14050003 14050003	14050003 14050003 14050003 14050003	14050003 14050003 14050003 14050003	14050003 14050004 14050004 14050004	

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DRAINAGE AREA		21.50	260.00 152.00 648.00 755.00	177.00 24.00 44.00 14.20	1.22 3.62 1.20 1.06 6.61	7.97 48.40 309.00 103.00 506.00	652.00 26.10 8.61 2.74	
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LATITUDE	411711 412325 412614 412634	412636 412925 412928 400301 400218	395915 395518 400018 400201 400048	394934 394720 394848 394701 394845	394707 394930 394936 395001 394738	394851 395014 395102 395217 395516	400439 395537 395422 395520	
STATION NAME AND LOCATION	SAND C NR BAGGS WY COW C AT MOUTH NR BAGGS WY MUDDY C AB CANARY GROVE DRAW NR BAGGS, WY MUDDY C NR DAD WY MUDDY C AB LITTLEFIELD C AT MC KEIL HOMESTEA	LITTLEFIELD C AT MOUTH AT MCKEIL HOMESTEAD W ALAMDSA C NR SULFUR SPRINGS RANCH, WY MUDDY C AB ALAMOSA C NR SULFUR SPRINGS RANCH LOST CREEK NEAR BUFORD, CO. MARVINE CREEK NEAR BUFORD, CO.	NORTH FORK WHITE RIVER AT BUFORD, CO. SOUTH FORK WHITE RIVER NEAR BUFORD, CO. WHITE RIVER ABOVE COAL CREEK, NEAR MEEKER, C WHITE RIVER NEAR MEEKER, CO.	PICEANCE CREEK BELOW RIO BLANCO, CO. MIDDLE FORK STEWART GULCH NEAR RIO BLANCO, C STEWART GULCH AB WEST FORK, NEAR RIO BLANCO. WEST FORK STEWART GULCH NEAR RIO BLANCO, CO. W F STEWART GULCH AT MOUTH, NEAR RIO BLANCO.	SORGHUM GULCH NEAR RID BLANCO, CO. SORGHUM GULCH AT MOUTH, NEAR RID BLANCO, CO. COTTONWOOD GULCH NEAR RID BLANCO, CO. PICEANCE CREEK TRIBUTARY NEAR RID BLANCO, CO SCANDARD GULCH NEAR RID BLANCO, CO.	SCANDARD GULCH AT MOUTH, NEAR RIO BLANCO. CO WILLOW CREEK NEAR RIO BLANCO, CO. PICEANCE CREEK AB HUNTER C, NEAR RIO BLANCO. BLACK SULPHUR CREEK NEAR RIO BLANCO. CO. PICEANCE CREEK BL RYAN GULCH, NR RIO BLANCO.	PICEANCE CREEK AT WHITE RIVER, CO. STAKE SPRINGS DRAW NEAR RANGELY, CO. CORRAL GULCH BELOW WATER GULCH, NR RANGELY, DRY FORK NEAR RANGELY, CO.	
HYDROLDGIC Unit Code	14050004 14050004 14050004 14050004	14050004 14050004 14050005 14050005	14050005 14050005 14050005 14050005	14050006 14050006 14050006 14050006	14050006 14050006 14050006 14050006	14050006 14050006 14050006 14050006	14050006 14050006 14050006 14050006	

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LONGITUDE	1083140 1082905 1082905 1082315	1082710 1082427 1082402 1084244 1090448	1090749 1090838 1090430 1090748 1090937	1090924 1090920 1090931 1091041	1091216 1091406 1091555 1091619 1091730	1090559 1091321 1091958 1092115 1092459	1092946 1092836 1093806 1091405	
LATITUBE	395318 395318 395450 395513 395602		395826 395826 394752 395054 394930	395258 395400 395704 395846 395715	395421 395650 395426 395628 395522	393203 393206 393931 394512 395758	395601 400315 400354 402434	
STATION NAME AND LOCATION	BOX ELDER GULCH NEAR RANGELY, CO. BOX ELDER GULCH TRIBUTARY NEAR RANGELY, CO. CORRAL GULCH NEAR RANGELY, CO. CORRAL GULCH AT 84 RANCH, CO. YELLOW CREEK TRIBUTARY NEAR 84 RANCH, CO.	DUCK CREEK AT UPPER STATION NEAR 84 RANCH, C DUCK CREEK NEAR 84 RANCH, CO. YELLOW CREEK NEAR WHITE RIVER, CO. WHITE RIVER ABOVE RANGELY, CO. WHITE R. NR. COLO. STATE LINE, UT.	WHITE RIVER ABV HELLS HOLE CANYON NR WATSON HELL'S HOLE CAN AT MOUTH NR WATSON UT EVACUATION CREEK ABV MISSOURI CR NR DRAGON U EVACUATION CR BLW PARK CAN NR WATSON UT THIMBLE ROCK CAN NR WATSON UT	EVACUATION CREEK AT WATSON UTAH EVACUATION CR TRIBUTARY NR WATSON UT EVACUATION CR NR MOUTH NR WATSON.UT WHITE R NR WATSON UT	SOUTHAM CAN WASH NR WATSON UT SOUTHAM CAN WASH AT MOUTH NR WATSON UT ASPHALT WASH BLW CENTER FORK NR WATSON UT ASPHALT WASH NR MOUTH NR WATSON, UTAH WHITE R BLW ASPHALT WASH NR WATSON UT	BITTER CREEK ABOVE DICK CANYON SWEETWATER CANYON BLW SOUTH CAN NR WATSON UT SWEETWATER CANYON CR NR MOUTH, NR WATSON, UT BITTER CREEK NR BONANZA, UTAH BITTER CR AT MOUTH NR BONANZA UT	SAND WASH NR DURAY UT COYOTE WASH NR MOUTH NR OURAY, UTAH WHITE RIVER AT MOUTH NEAR OURAY UTAH GREEN RIVER NEAR JENSEN, UTAH	
HYDROLOGIC Unit Code	14050006 14050006 14050006 14050006	14050006 14050006 14050006 14050007 14050007	14050007 14050007 14050007 14050007	14050007 14050007 14050007 14050007	14050007 14050007 14050007 14050007	14050007 14050007 14050007 14050007	14050007 14050007 14050001	

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, DRAINAGE AREA	3920.00 35500.00	89.70 288.00 897.00	29.10 23.00 25.30 12.50	1500.00				
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STATE	049 049 049	0 00000	049 049 049 049	049 049 049 049	049 049 049 049	049 049 049 049	049 049 049	
LONGITUDE	1094705 1094340 1095222	1094505 1093522 1094354 1094229 1093900 1111658	11110938 11105309 1104038 1102133	1102045 1100902 11111117 1111144	1110915 1111020 11111150 11111210	1111500 1111634 1111611 1111644 1111759	1111724 1111645 11111247 11111613	
LATITUDE	401257 400420 400457 400310	393358 393130 395235 395630 391633	392236 394318 394119 394209	391550 385910 391518 391739 392606	393147 393336 393515 393535	391717 391919 392100 392016 391814	391815 392052 390604 392052	
STATION NAME AND LOCATION	DUCHESNE RIVER NEAR RANDLETT, UTAH GREEN RIVER NEAR OURAY, UTAH PARIETTE DRAW NEAR MYTON, UTAH PARIETTE DRAW NR EIGHT MILE FLAT NEAR MYTON	PARIETTE DRAW AT MOUTH NEAR OURAY, UIAH REID RANCH CANAL NR OURAY UT HILL CR ABY TOWAVE RES NR OURAY UT HILL CR NR MOUTH NR OURAY UT WILLOW CREEK NEAR OURAY, UTAH SWASEY CREEK BELOW SUMMER HOMES	BLACK CANYON AT BRIDGE PLEASANT VALLEY CR. BLW WINTER QUARTER GR AT SPRING CANYON BLW SOWBELLY GULCH AT HELPER, COAL CREEK NEAR HELPER HORSE CANYON NR. SUNNYSIDE, UT.	PRICE RIVER AT WOODSIDE, UTAH GREEN RIVER AT GREEN RIVER, UTAH SWASEY DIVERSION BELOW FOREST BD SEELY GREEK AT GAGE LOWRY WATER AT POTTERS PONDS	HUNTINGTON CREEK FLUSH 321 HUNTINGTON CREEK FLUSH 322 HUNTINGTON CREEK FLUSH 323 HUNTINGTON CREEK FLUSH 324 LOWER STRAIGHT CYN. AT FOREST BD	UPPER STRAIGHT CANYON LOWRY WATER AT GAGE INDIAN CREEK AT GAGE REEDER CYN BELDW SUMMER HOMES LITTLES CREEK AT GAGE	LITTLES CREEK AT HI-WAY BRIDGE INDIAN CREEK AT ROAD CULVERT FERRON CREEK USGS STATION INDIAN CREEK AT ROAD CULVERT	
HYDROLOGIC UNIT CODE	14060003 14060005 14060005	14060005 14060006 14060006 14060006 14060006	14060007 14060007 14060007 14060007	14060007 14060008 14060009 14060009	14060009 14060009 14060009 14060009	14060009 14060009 14060009 14060009	14060009 14060009 14060009	

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DRAINAGE AREA		5.70 11.70 21.90	205.00 221.00 1284.00 1670.00 76600.00	841.00 1552.00 115.00	111800.00	14.00	69.10 69.80 96.40	21.90	
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3TAT2	049	049 049 049	049 049 049 049	049 049 049 049	049 0049 004 004	0049 008 008	8000	008 008 035	
LONGITUDE	111759		1110745 1105920 1103956 1102220	1111449 1105713 1104200 1110530	1113910 1113515 1115323 1114032	1113538 1114032 1115323 1065300 1064738	1064845 1065024 1070235 1064120	1064904 1065033 1065425 1070326	
LATITUDE	391814	392748 392731 391947 391826	391600 390709 390451 385220 374830	385900 383347 382410 381620 381640	375745 365153 370431 365647	365220 365647 370431 372647	371211 370830 370724 370507	370426 370244 370010 365717	
STATION NAME AND LOCATION	LITTLES CREEK AT GAGING STATION	CRANDALL CANYON AT MOUTH, NR HUNTINGTON, UT TIE FORK CANYON NR. HUNTINGTON, UTAH EPHRAIM TUNNEL NEAR EPHRAIM, UTAH COTTONWOOD CR.ABV STR.CANYON,NR ORANGEVILLE.	COTTONWOOD CREEK NEAR ORANGEVILLE, UTAH FERRON CREEK BEL PARADISE RANCH NR CLAWSON, SAN RAFAEL R AT SAN R BR CAMPGROUND NR C DAL SAN RAFAEL RIVER NEAR GREEN RIVER, UTAH COLORADO RIVER AT HITE, UTAH	MUDDY C AT USGS STATION MUDDY CR AT DELTA MINE NR HANKSVILLE, UT. 21 MUDDY CREEK AT MOUTH NR HANKSVILLE, UT. 11.0 PLEASANT CR NR CAINEVILLE, UT. 72.00 FREMONT RIVER NR CAINVILLE, UT. 71.00	PINE C BLUE SPRUCE C G COLORADO R AT LEES FERRY, AZ. PARIA R. AT WHITE HOUSE RUINS NR GLEN CANYON PARIA R. BLW. WATER POCKETS GULCH NR PAGE,AZ PARIA R FAKE STA TONS DIV BY 10	PARIA RIVER AT LEES FERRY, ARIZ. PARIA R. BLW. WATER POCKETS GULCH NR PAGE.AZ PARIA R. AT WHITE HOUSE RUINS NR GLEN CANYON WOLF CREEK NEAR PAGOSA SPRINGS, CO. RIO BLANCO NEAR PAGOSA SPRINGS, CO.	RIO BLANCO BL BLANCO DIV DAM, NR PAGOSA SPS. RIO BLANCO AT US HIGHWAY 84, NR PAGOSA SPGS. RIO BLANCO AT MOUTH, NEAR TRUJIL NAVAJO R AT BANDED PEAK RANCH, NEAR CHROMO. NAVAJO R IVER ABOVE CHROMO, CO.	LITTLE NAVAJO RIVER BL LITTLE OS LITTLE NAVAJO RIVER AT CHROMO, CO. NAVAJO RIVER AT EDITH, CO. NAVAJO R. AB AMARGO CR. NR DULCE	
HYBROLOGIC Unit Code	14060009	14060009 14060009 14060009	14060009 14060009 14060009 14060009	14070002 14070002 14070003 14070003	14070005 14070006 14070007 14070007	14070007 14070007 14070007 14080101	14080101 14080101 14080101 14080101	14080101 14080101 14080101	

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DRAINAGE AREA	1230.00 72.10 270.00 510.00	3260.00 3560.00 5410.00		32.20 629.00 55.90	11.00 1090.00 1360.00 1270.00 7240.00	37.00 331.00 583.00 62.80	73.80 12900.00	
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LONGITUDE	1070756 1071842 1073235 1073437	1074151 1074850 1075910 1080542 1080730	1075930 1080543 1074848 1074410 1074225	1070946 1072350 1074521 1074521	1074331 1075225 1081208 1080012 1081330	1080224 1081117 1081451 1082409 1082342	1082626 1084354 1084409 1083214	
LATITUDE	370126 370049 372839 372258 37034	364805 364350 364200 364122 363852	364005 364122 364327 364655 364743	372912 370518 364124 364124 374959	375104 370217 364312 364930 364322	371723 365959 364423 364823	364624 364732 364422 364447	
STATION NAME AND LOCATION	NAVAJO R. AT MOUTH NR JUANITA, C SAN JUAN RIVER NR CARRACAS, COLORADO VALLECITO CREEK NEAR BAYFIELD, CO. LOS PINOS RIVER NEAR BAYFIELD, 'CO. LOS PINOS RIVER AT LA BOCA, COLO.	SAN JUAN RIVER NEAR ARCHULETA.NM SAN JUAN R NR BLANCO.NM SAN JUAN RIVER AT BLOOMFIELD. NM SAN JUAN RIVER AT HAMMOND BR NR BLOOMFIELD.N GALLEGOS CANYON NR FARMINGTON, NM	28N.11W.15.122 KUNTZ CAN AT STHWY 44,NM 29E6 SAN JUAN RIVER AT WEST HAMMOND BRIDGE, NM SAN JUAN RIVER AT BLANCO BRIDGE, NM 30N.09W.25.143 PUMP CANYON AT ARCHULETA.NM 6 30N.09W.19.422 GOBERNADOR WASH AT ARCHULETA	MIDDLE FORK PIEDRA RIVER NR PAGOSA SPRINGS, PIEDRA RIVER NEAR ARBOLES, COLO. CANON LARGO NR BLANCO,NM 29N.O9W.26.334 CANYON LARGO NR BLANCO,NM 29E ANIMAS RIVER AT HOWARDSVILLE, CO.	MINERAL CREEK ABOVE SILVERTON, CO. ANIMAS RIVER NEAR CEDAR HILL, N. MEX. ANIMAS RIVER AT FARMINGTON, NM 30N.11W.09.311 ANIMAS R BL HIWAY 550 AT AZTE SAN JUAN RIVER AT FARMINGTON, NM	LA PLATA RIVER AT HESPERUS, CO. LA PLATA RIVER AT COLORADO-NEW MEXICO STATE LA PLATA RIVER NEAR FARMINGTON, NM SAN JUAN R NR FRUITLAND, NM	SHUMWAY ARROYO NEAR WATERFLOW, NM SAN JUAN RIVER AT SHIPROCK, NM SAN JUAN RIVER AT FRUITLAND BRIDGE, NM SAN JUAN RIVER IN HOGBACK DIVERSION BYPASS,	
HYDROLOGIC Unit Code	14080101 14080101 14080101 14080101	14080101 14080101 14080101 14080101	14080101 14080101 14080101 14080101	14080102 14080102 14080103 14080103	14080104 14080104 14080104 14080105	14080105 14080105 14080105 14080105	14080105 14080105 14080105 14080105	

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NISA8 AOT4IRJ230				904				
DRAINAGE AREA		578.00 8.21 31.00	183.00 45.60	4350.00				
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LONGITUDE	1082610 1084134 1082550 1082550	1073139 1075504 1075325 1075647 108 1052	1081157 1081512 1081506 1082722 1082716	1083357 1083527 1080818 1074843 1080120	1075720 1081038 1075714 1083234 1075635	1082021 1080747 1074318 1080842 1080715	1080846 1081511 1083252 1083357	
LATITUDE	364631 364650 364843 365029	355607 360143 360206 360918 361407	361351 361637 361533 361826 362111	362157 364328 355841 360308	360614 360641 360743 360809 360916	361137 361407 361432 361439	361528 361534 361751 362157	
STATION NAME AND LOCATION	SHUMWAY ARROYD ABOVE DUNLAP FARM NR WATERFLO SAN JUAN RIVER AT SHIPROCK BRIDGE, NM WESTWATER ARROYD ABOVE SAN JUAN MINE, NM 30N.15W.06.422 WESTWATER ARR NR SPRINGS 3SWE SAN JUAN RIVER ABOVE MANCOS, NM	CHACO WASH NR STARLAKE TRADING POST. NM CHACO WASH AT CHACO CANYON NATIONAL MONUMENT GALLO WASH AT CHACO NATIONAL MONUMENT, NM AH-SHI-SLE-PAH WASH NEAR KIMBETO ,NM ALAMO WASH NEAR TANNER LAKE , NM	DE-NA-ZIN WASH NR BISTI TRADING POST, NM HUNTER WASH AT BISTI TRADING POST, NM HUNTER TRIBURARY AT ROAD XING S. OF BISTI TP TEC-NI-DI-TSD WASH NR BURNHAM, NM BURNHAM, NM	CHACO RIVER NE BURNHAM, NM CHACO RIVER NEAR WATERFLOW, NM 20N.12W.08.323 KIMMENIOLI WASH 9 MI S LK VAL 21N.09W.17.233 GALLO WASH AT DIKE NR CHACO N 21N.11W.05.4220 CHACO R BL E.WASH,CHACO N.M.	22N.11W.25.433 ESCAVADO WASH AT HIWAY 56 BR. 22N.13W.25.322 KIMMENIOLI WASH NR LAKE VALLE 22N.11W.24.214 TSOSIE SWALE NR KIMBETO.NM NRO67.0225XO788 CDYOTE WASH NR NASCHITII.NM 22N.10W.07.143 AHSHISLEPAH WASH,6 M W KIMBET	NROGG.O500X0388 CHACO R BL DENAZIN W NR BIST COAL CREEK ABOVE TANNER LAKE NEAR BISTI TP , 23N.O8W.O7.2331 KIMBETO W AT STHWY 44.NM 23N.12W.O8.1341 DENAZIN TRIB 7.4 MI SE BISTI DE-NA-ZIN WASH ABOVE TANNER LAKE .NM	23N.12W.05.1334 DENAZIN TRIB 7.2 MI SE BISTI 23N.13W.05.1413 HUNTER T AT RDX NRO49.0268X1397 CHACD R BL HUNTER WA NR BURN NRO49.0367X0923 CHACD R AT BRIDGE NR BURNHAM	
HYDROLOGIC Unit CDDE	14080 105 14080 105 14080 105 14080 105 14080 105	14080106 14080106 14080106 14080106 14080106	14080106 14080106 14080106 14080106	14080106 14080106 14080106 14080106 14080106	14080106 14080106 14080106 14080106 14080106	14080106 14080106 14080106 14080106	14080106 14080106 14080106 14080106	

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SUSP OISCHARGE	44000	AANO	
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BEIZ TRAM MEUZ	ৰৰ ৫৯	4440	
SUSP SED CONCEN	44000	44ZO	
OW END YEAR	1978		
OW BEGIN	1976 1977 1960 1978	1975 1977 1969 1852	
BASIN AOT41A3230	124	124 014	
DRAINAGE AREA	550.00	350.00	
TYPE OF	**************************************	MS MS NS NS	
CDUNTY	045 045 083 037	083 037 083 037	
STATE	035 008 008	008 049 049	·
LONGITUDE	1083441 1083349 108427 1090200 1093441	1090150 1091121 1090054 1095151	
LATITIDE	362813 363417 370139 373338	370010 371251 371927 370849	
STATION MAME AND LOCATION	NRO49.0433XO206 SANDSTEE WASH NR SANDTEE TP, NRO32.0352X1230 CHACD R AB 4CPP NR FRUITLAND MANCOS RIVER NEAR TOWADC, CO. SAN JUAN R AT FOUR CORNERS, CO	SAN JUAN R AT 4 CORNERS BRIDGE.CO SAN JUAN R AB MCELMO CK AT ANETH.UT MCELMO CREEK NEAR COLORADO-UTAH STATE LINE SAN JUAN RIVER NEAR BLUFF, UTAH	
HYDRDLOGIC Unit CODE	14080106 14080106 14080107 14080201	14080201 14080201 14080202 14080205	

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SUSP DISCHARGE			7	4 lb m D	ашааа	ል የ የ መ የ የ	NZARA	Z K X W	
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2025 CONCEN		EEE30	MEEEE	Σ 00m0 ∑m m	0000 0000 0000	A W H K K	ZZARR	ZAXW	
OW END YEAR			1977 1977 1977	1977	1978 1974 1978	1967	1979	1979	
MD38 WD AA3Y		1964 1958 1964 1958	1925 1975 1975 1975	1975 1966 1958 1966 1973	1966 1966 1962 1967 1961	1966 1977 1966 1977	1946 1977 1977 1977	1977 1977 1968 1968	
NIZAB AOTAIRJ230	_ 		124	024 124 004 004	000 440 410 410	00000 444444	000 004 004 004	013	
DRAINAGE AREA	<u>N</u>	183700.00	137800.00 4.81 14.80 2.49 9.80	16.60 1085.00 171700.00 74.00 5.65	35.70 350.00 934.00 1530.00 338.00	1650.00	5090.00 5980.00	2125.00 2193.00	
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3TAT2		000 000 000 000 000	004 049 049 049	000 000 000 000 000 000	049 049 049 049	049 049 0049 004	000 033 000 000 000 000	0004 049 032 032	
LONGITUDE	ADC	1142600 1143715 1143735 1143800 1144300	1120508 1122030 1121937 1122046 1122219	0 1122046 0 1123445 3 1144413 9 1123613 0 1124642	1124802 1125840 1131225 1132342 1134635	1133240 1133756 1134050 1134646	1135135 1135525 1141810 1135135	1134646 1133756 1145905 1145415	
LATITUDE	ORA	343715 324345 332550 324400	360605 372149 371918 371810 372011	371810 365150 360058 372019	372511 371235 371154 370945 371305	370335 370149 370050 365713	365517 365330 364010 365517 365657	365713 370149 360520 360720	
STATIOM NAME AND LOCATION	LOWER COL	COLORADO R AT RIVER SEC COLORADO R AT YUMA ARIZ COLO R AT TAYLOR FERRY GILA R AT MOUTH AZ COLORADO R AT N INTERNA	COLORADO R. NEAR GRAND CANYON, ARIZ. MILL CREEK ABOVE STUDY AREA NR GLENDALE.UT. SKUTUMPAH CR. BL STUDY AREA NR GLENDALE.UT. INTERMEDIATE DRAINAGE NR. GLENDALE, UT. THOMPSON CREEK ABY STUDY AREA NR GLENDALE, U	THOMPSON CREEK BLW STUDY AREA NR GLENDALE, U KANAB CREEK NR FREDONIA, ARIZ. LAKE MEAD AT HOOVER DAM, ARIZNEV. EAST FORK VIRGIN RIVER NR GLENDALE, UTAH NF VIRGIN R.NR.GLENDALE,UTAH	NF VIRGIN R BLW BULLOCK CANYON NR GLENDALE UNDRTH FORK VIRGIN RIVER NEAR SPRINGDALE, UTAH VIRGIN RIVER AT VIRGIN UTAH VIRGIN RIVER NR HURRICANE UTAH SANTA CLARA RIVER AB WINSOR DAM NR SANTA CLA	FORT PIERCE WASH NR ST. GEORGE, UTAH VIRGIN R. AT BLOOMINGTON,UT VIRGIN RIVER NEAR ST. GEORGE,UTAH VIRGIN R. ABV 115 RESTAREA NR LITTLEFIELD, A VIRGIN R. BLW 115 RESTAREA NR LITTLEFIELD,AZ	VIRGIN R. AT MOUTH OF NARROWS NR LITTIEFIELD VIRGIN R. AT LITTLEFIELD, AZ VIRGIN R. AB HALFWAY WASH NR RIVERSIDE NV VIRGIN R. AT MOUTH OF NARROWS NR LITTIEFIELD VIRGIN R. BLW 115 RESTAREA NR LITTLEFIELD,AZ	VIRGIN R. ABV I15 RESTAREA NR LITTLEFIELD, A VIRGIN R. AT BLOOMINGTON,UT LAS VEGAS WASH NR HENDERSON, NV LAS VEGAS WASH NR BOULDER CITY, NV	
HYDROLOGIC Unit Code		150059 F 150059 Q 150059 S 150059 S	15010001 15010003 15010003 15010003	15010003 15010003 15010005 15010008	15010008 15010008 15010008 15010008	15010009 15010010 15010010 15010010	15010010 15010010 15010010 15010010	15010010 15010010 15010015	

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SUSP OISCHARGE		Σ∢Σ	Σ বৰব	400N	AAZNN	2222	0 2 2	ш	
3SI2 TRAS TAM G3B		0			<u> </u>		OEE	¥ 2	
SOZE SED CONCEN		Z A Z A D	20444	A A 0 0 0 2 Z Z Z	Z Z Z Z Z	NNNN	ZZ E N N	Z Z Z Z	
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MID38 WD AA3Y		1978 1971 1976 1978	1976 1977 1975 1976	1975 1971 1973 1979	1973 1979 1974 1957	1973 1973 1973 1973	1978 1972 1972 1964 1955	1939 1965 1964 1964	
NIZA8 AOT4IA3230		004 124 124	124	124 124 004	00 00 4 00 4	0000 444444	004	124	
DRAINAGE AREA		30.90 80.00 747.00 975.00	68.60	11300.00 12200.00 809.00	51.00 68.00 24000.00 26500.00	34.10 .62 .62 18.60 49.00	137.00 1650.00 1660.00	180700.00	
TYPE OF		AS W S W S W	NS N S N S N S N	AS S AS	NS N S N S N	NS N S N S N	N S N S N S N S N S N S N S N S N S N S	EEEE	
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STATE		0000 4 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	004 035 035 035	0035 004 004 004	00000 44444	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	00000 44444	000 000 000 000	
tongityDE		1092724 1091110 1092118 1092423	1095914 1100700 1084441 1090220 1084114	1082947 1100945 1101517 1101203 1092700	1113924 1113756 1112440 1113400	1102211 1102402 1102428 1102249 1102620	1102632 1110919 1111204 1142745 1143520	1144416 1140923 1142950 1143210	
LATITUDE		340100 340156 341950 343501	341046 342800 353145 352240 353150	353923 345352 345404 345418 354400	351318 351104 355240 355535 363103	363252 363154 363152 363439 363033	362534 360636 360618 344115	360055 341858 334310 335535	
STATION NAME AND LOCATION		LITTLE COLORADO RIVER AT GREER, ARIZ. NUTRIOSO CR. AB. NELSON RES NR SPRINGERVILLE LITTLE COLORAD R AB LYMAN RES NR ST JOHNS, A LITTLE COLORADO RIVER AB ZION RES NR ST JOHN ZUNI R AB BLACK ROCK RESERVOIR	SHOW LOW CREEK NEAR LAKESIDE, ARIZONA COTTONWOOD WASH NR SNOWFLAKE PUERCO RIVER AT GALLUP, NM 21N.13W.11.144 PUERCO RIVER NEAR STATE LINE, PUERCO RIVER AT THE HOGBACK, NM	PUERCO RIVER TRIBUTARY BL MINES AT CHURCHROC LITTLE COLORADO RIVER AT HOLBROOK, ARIZ. LITTLE COLORADO R NR JOSEPH CITY, AZ. LEROUX WASH NR HOLBROOK AZ KIN LI CHEE WASH NR GRANADO	RIO DE FLAG AT FLAGSTAFF, ARIZ. RIO DE FLAG AT 140 AT FLAGSTAFF,AZ LITTLE COLORADO R AT CAMERON ARIZ. LITTLE COLORADO RIVER NEAR CAMERON, ARIZ. MOENKOPI WASH TRIB NEAR KAYENTA, ARIZ	CDAL MINE WASH NEAR KAYENTA, ARIZ CDAL MINE WASH TRIB NEAR KAYENTA, ARIZ CDAL MINE WASH TRIB NO 2 NEAR KAYENTA, ARIZ. YELLOW WATER CANYON NEAR KAYENTA, ARIZ YELLOW WATER CANYON NR SHONTO	CDAL MINE WASH NR MOUTH NR SHONTO, ARIZ MOENKOPI WASH NR MOENKOPI AZ MOENKOPI WASH AT MOENKOPI COLORADO R NEAR TOPOCK COLORADO R AT NEEDLES BRIDGE	COLORADO RIVER BLW HOOVER DAM,ARIZ-NEV COLORADO R AQUEDUCT NR PARKER DAM ARIZ-CALIF COLORADO R BL PALO VERDE DAM COLO R AT YATER YHEEL	
HYDROLOGIC Unit Code		15020001 15020001 15020001 15020002	15020005 15020005 15020006 15020006	15020006 15020008 15020008 15020009	15020015 15020015 15020016 15020016	15020018 15020018 15020018 15020018	15020018 15020018 15020018 15030101	15030101 15030101 15030104 15030104	-

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NOITAS NADRO BODD	US GS US GS S S US GS S S US GS S S US GS S US	USGS USGS USGS USGS USGS	USBR USGS USGS USFS	USFS USFS USFS USFS USFS	USGS USGS USFS USFS	USGS USGS USGS USGS USGS	USFS USFS USFS USFS	
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3512 TRAY TAM 038								
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2026 SED CONCEN	40282	XZAXX	OMOAA	<u> </u>	A A A A	m A 55 A	4044	
OW END YEAR		1979	1972 1975 1975	1975 1978 1978 1978	1969 1975 1975	1972 1973 1975	1975 1976 1975 1975	
OW BEGIN	1953 1965 1977 1977	1977 1977 1977 1977	1977 1969 1969 1975	1975 1967 1967 1967 1967	1958 1967 1975 1975	1967 1969 1967 1976	1975 1967 1975 1975	
NISA8 Rotairos30	124	00 4 4 00 4 00 4	014		004	0 4 4 4 4 4 4		
DRAINAGE AREA	182700.00		5140.00		1864.00	2829.00 3360.00 4010.00		
TYPE OF SITE	3 3 3 3 3 0 0 0 0 0	N A A A A A A A A A A A A A A A A A A A	X X X X X X X X X X X X X X X X X X X	N N N N N N N N N N N N N N N N N N N	X X X X X	SEE	N N N N N N N N N N N N N N N N N N N	
YTNUOD	071 027 015 025	025 025 025 015 015	027 027 023 003 003	017 017 003 017 003	017 017 017 017	017 023 011 011 003	6003 0000 0000	
3TAT2	000 000 000 000	000 000 000 000 000	004 004 035 035 035	035 035 035 035 035	035 035 035 035 035	035 035 035 004 035	035 035 035 035	
LONGITUDE	1140822 1144716 1133725 1131755	1131350 1131755 1131755 1132635	1140140 1090248 1080432 1075307	1081513 1081212 1081443 1081304 1081557	1083212 1083857 1085510 1083534 1081505	1084030 1090240 1090250 1091835 1085527	1085140 1085247 1084444 1084442	
LATITUDE	341744 322917 342745 343705	343623 343645 343705 343250 343230	341543 324142 332113 332937	331103 331046 331327 330228 331348	330340 331000 330159 325053	324337 324105 324112 325757 332709	332332 331450 334056 334056	
STATION NAME AND LOCATION	COLORADO RIVER BELOW PARKER DAM, ARIZCALIF MAIN DRAIN AT ARIZ-SONORA BOUNDARY BIG SANDY RIVER NEAR WIKIEUP,ARIZ. BURGO CREEK ABY GOULDER CREEK NR BAGDAD.AZ	COPPER CREEK NR MOUTH NR BAGDAD, AZ. BOULDER CREEK NR MOUTH NR BAGDAD,AZ. BURRO CREEK ABV BOULDER CREEK NR BAGDAD, BURRO CREEK AT US 93 BRIDGE NR BAGDAD, A	BILL WILLIAMS R NR PLANET BILL WILLIAMS R NR PLANET, ARIZ. SUNSET CA AB NM-AZ STATELINE,NM TAYLOR CREEK ABOVE WALL LAKE HARDCASTLE CANYON NE OF BEAVHED	LITTLE CR ABOVE CONF WITH GILA R E F GILA R AT FIRST RD CROSSING M F GILA R AT VISITOR CENTER SAPILLO RIVER AT HIGHWAY BRIDGE W F GILA R ABOVE CLIFF DWELLINGS	GILA RIVER NEAR GILA, NM MOGDLLON CREEK NEAR CLIFF, NM MCNIGHT CREEK BELOW S.AN N FORKS GILA RIVER BELOW CLIFF NM BEAR CREEK BELOW CHERRY CREEK	GILA RIVER NEAR REDROCK, NM NEW MODEL CA AB NM-AZ ST.LINE,NM GILA RIVER AT N.MEX-ARIZ.ST.LINE NR VIRDEN, GILA RIVER NEAR CLIFTON, ARIZ. SAN FRANCISCO ABOVE ALMA NM	MINERAL CR ABOVE GLENWOOD NM FRISCO HOT SPRINGS BELOW GLNWOOD TULAROSA CR ABOVE CONF OF NEGRIT NEGRITO CR ABOVE CON OF TULAROSA	
HYDROLOGIC Unit Code	15030104 15030108 15030108 15030201 15030202	15030202 15030202 15030202 15030202 15030202	15030204 15030204 150360 C 15040001 15040001	15040001 15040001 15040001 15040001	15040001 15040001 15040002 15040002	15040002 15040002 15040002 15040002	15040004 15040004 15040004 15040004	

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ORGANIZATION SGOD	USFS USFS USFS USFS	USFS USGS USGS USGS USGS	USGS USGS AZOO3 AZOO3 AZOO3	USGS USGS USGS AZOO3 USGS	USGS USGS USGS AZOO1 AZOO1	USBR USGS USGS USGS AZOO1	USGS USGS USGS AZOO3
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OW END RA3Y	197 197 197 197	197	197	197	196	1968	
OW BEGIN	1975 1967 1967 1967	1970 1963 1963 1976 1959	1963 1974 1967 1967 1971	1976 1949 1962 1971 1966	1979 1962 1965 1969 1969	1977 1967 1976 1965 1969	1974 1976 1972 1972
NIZAB Rotqirj230		014 024 004 024	004	124 024 024	004 024 024	024	124 0024 004
44.		8888	8.8	888 8	888	8 8	888
DRA!NAGE AREA		1653. 2766. 2770. 7896.	24.	13268. 18011. 1219. 2500.	4360. 4449. 4471.	533.	8581. 1232. 632.
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STATE	035 035 035 035 035	035 004 004 004	0000 4 4 4 4 4	000 4 4 4 4 4	00000 444444	000 4 4 4 4 4 4 4 4	0000 0000 0000 0000
LONGITUDE	1083627 1084726 1085130 1085918	1085406 1085247 1091743 1091806 1093038	094539 101310 104300 104300	104555 105833 101026 104600	104327 104455 104611 105650 105645	105 103 105 930 105 85 2 105 305	121008 101240 100958 104300
ä							
LATITUDE	333224 333815 335305 334904 334913	334857 331448 330258 330133 325206	325000 331108 330500 330500	330006 330610 313733 325500 320735	325103 325635 325838 321328	312813 321316 321437	331356 334246 334411 341300
STATION NAME AND LOCATION	SOUTH FK OF NEGRITO CR SAN FRANCISCO BELOW RESERVE NM CENTERFIRE CR ABOVE LUNA NM SAN FRANCISCO RIVER AT 180 BRIDG TROUT CREEK, FOR RD 119 CROSSING	SAN FRANCISCO RIVER BELOW LUNA SAN FRANCISCO RIVER NEAR GLENWOOD, NM SAN FRANCISCO RIVER AT CLIFTON, ARIZ. SAN FRANCISCO RIVER NEAR CLIFTON, ARIZ. GILA R AT HEAD OF SAFFORD VALLEY NR SOLOMON	FRYE CREEK AT THATCHER, ARIZ. GILA RIVER AT CALVA, ARIZ. DRIPPING SPRINGS WASH AB GILA R GILA R AB DRIPPING SPRINGS WA GILA R NR DIAMOND A RANCH	GILA RIVER AT WINKELMAN, ARIZ. GILA R AT KELVIN ARIZ SAN PEDRO RIVER AT CHARLESTON, ARIZ. SAN PEDRO R AB GILA R SAN PEDRO RIVER NEAR BENSON, ARIZ.	SAN PEDRO R BL ARAVAIPA C NR MAMMOTH AZ SAN PEDRO RIVER NEAR WINKELMAN, AZ. SAN PEDRO R AT WINKELMAN, ARIZ. HIGH SCHOOL WASH FLUME AT TUCSON RAILROAD WASH FLUME AT TUCSON	SANTA CRUZ NR CONF W LOS ROBLES WA SANTA CRUZ RIVER NR. NOGALES, ARIZ. SANTA CRUZ RIVER AT RID RICO, ARIZ. SANTA CRUZ RIVER AT TUCSON, ARIZ. ARCADIA WASH FLUME AT TUCSON	SANTA CRUZ RIVER NEAR LAVEEN, ARIZ. BLACK RIVER NEAR FORT APACHE, ARIZ. MILE 5.0 WHITE RIVER NEAR FORT APACHE, ARIZ. MILE 4.5 CANYON CR FISH HATCHERY EFFLUENT
HYDROLOGIC Unit Code	15040004 15040004 15040004 15040004	15040004 15040004 15040004 15040005	15040005 15040005 15050100 15050100	15050100 15050100 15050202 15050203 15050203	15050203 15050203 15050203 15050301	15050301 15050301 15050301 15050301	15050303 15060101 15060102 15060103

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9012 G32	44000	0000	00000	0040	000	
ORGANIZATION	A Z003 A Z003 A Z003 A Z003	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USBLM USBLM	
SUSP DISCHARGE	Σ	VV	0 Z m m	Σ ∢	ωΣΣ	***************************************
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NISA8 AOT4IA3230	024 004 014	000 024 000 000 000	0000 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	00 00 00 4	014	
DRAINAGE AREA	4306.00 675.00 6232.00	255.00 2530.00 3520.00	24.60 142.00 5024.00 36.40 6188.00	4.58 4.49 49650.00 1637.00	57950.00 1250.00 1023.00 47.20	
30 39YT 3TI2	**************************************	N N N N N	N N N N N	N N N N N	3333	
COUNTY	007 007 007 007	025 025 025 005 005	025 025 025 007 013	013 013 021 021	027 019 003 035	
STATE	000 4000 4000	0004 0004 0004	0004 0004 0004	000 000 000 000 000 000 000	0004	
LONGITUBE	1104300 1104300 1105515 1111810	1123645 1122026 1120355 1114349	1114023 1114630 1114700 1114132	1112912 1112739 1124617 1121814	1143309 1122036 1093504 1100635	
LATITUDE	341300 341300 333710 335848	345200 345342 345105 345313 344928	344601 344343 342700 340939 334905	335738 335658 331336 333624	324245 315652 312108 422528	
STATION NAME AND LOCATION	CANYON CR FISH HATCHERY INTAKE CANYON C AB STATE FISH HATCHERY SALT RIVER NEAR ROOSEVELT, ARIZ. TONTO CREEK ABV. GUN CR., NR ROOSEVELT, AZ SALT R BL STEWART MOUNTAIN D ARIZ	WILLIAMSON VALLEY W NR PAULDEN, ARIZ. VERDE RIVER NEAR PAULDEN, ARIZ. VERDE RIVER NR CLARKDALE, ARIZ. OAK CREEK AT SEDONA, AZ. OAK CREEK AT RED ROCK CROSSING NR SEDONA,ARI	RATTLESNAKE CANYON NEAR RIMROCK, ARIZ. DRY BEAVER CREEK NEAR RIMROCK, ARIZ. VERDE RIVER NEAR CAMP VERDE, ARIZ. WET BOTTOM CREEK NR CHILDS, ARIZ. VERDE R BL BARTLETT D ARIZ	WF SYCAMORE CR AB MCFAR CAN, N SUNFLOWER, AZ EAST FORK SYCAMORE CREEK NEAR SUNFLOWER, ARI GILA R AB DIVERSIONS AT GILLESPIE DAM AZ. GILA R PAINTED ROCK DAM AGUA FRIA RIVER AT EL MIRAGE, ARIZ.	GILA RIVER NEAR MOUTH, NEAR YUMA, ARIZ. VAMORI WASH NR KOM VO AZ WHITEWATER DRAW NEAR DOUGLAS, ARIZ. DRY BASIN CREEK T28N R112W SEC12	
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STATION NAME AND LOCATION	GREAT BAS	FY77 REESTABLISH DWDC 52053 SHERRILL DRIVE UT HEAVENLY VALLY CREEK AT 8800 FT HEAVENLY VALLEY CREEK AT 8160 FT C HEAVENLY VALLEY CREEK AT 8120 FT	HEAVENLY VALLEY CREEK AT 8000 FT C HEAVENLY VALLEY CREEK AT 7960 FT C HEAVENLY VALLEY CREEK AT 6440 FT C HEAVENLY VALLEY FRONT NO 1 CA HEAVENLY VALLEY FRONT NO 2 CA	HEAVENLY VALLEY FRONT NO 3 CA HEAVENLY VALLEY FRONT NO 4 CA HEAVENLY VALLEY FRONT NO 5 CA HEAVENLY VALLEY FRONT NO 8 CA COLD CREEK UPSTREAM CA	COLD C AT PIDNEER TRAIL CA TWIN CREEK AT SAGE WYO BEAR R AT BORDER WY BEAR LAKE OUTLET CANAL NEAR PARIS IDAHO STATE FISH HATCHERY GRACE ID	LOGAN R AB ST DAM NR LOGAN UT LOGAN R BELOW ST DAM NR LOGAN UT BEAR R NR CORINNE WEBER RIVER NR PLAIN CITY UTAH LITTLE COTTONWOOD CREEK NEAR SALT LAKE CI	BIG COTTONWOOD CR NR SALT LAKE CITY UTAH BIG COTTONWOOD C AT COT LANE SLC UTAH MILL CREEK NEAR SALT LAKE CITY, UTAH JORDAN R @ 2100 SO SALT LAKE CITY UTAH PARLEYS CK.AT SUICIDE RK.,NR.SALT LAKE CITY	EMIGRATION CREEK NEAR SALT LAKE CITY, UTAH RED BUTTE CREEK AT FT. DOUGLAS NR. SLC, UTAH CITY CK AB WASATCH DRIVE NR SALT LAKE CITY U SB VITRO WASTE D AB CONFL WITH VIT	
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STATION NAME AND LOCATION	MAMMOTH CREEK E F SEVIER R TROPIC RE SHEEP C NR SALINA UT WF SHEEP C NR SALINA UT MILL CREEK NEAR GLENWOOD, UTAH	SEVIER RIVER NEAR LYNNDYL, UTAH COAL CREEK NEAR CEDAR CITY, UTAH MERCHANT C UPPER BEAVER MERCHANT C LOWER BEAVER NF THREE C LOWER BEAVER	MF THREE C UPPER BEAVER MF THREE C LOWER BEAVER BEAVER RIV AT ADAMSVILLE, UTAH HUMBOLDT R AT PALISADE, NV N F HUMBOLDT R AT DEVILS GATE NR HALLECK, NV	S F HUMBOLDT R AB DIXIE C NR ELKO, NV HUMBOLDT R NR ROSE C NV HUMBOLDT R NR IMLAY, NV HUMBOLDT R NR RYE PATCH, NV MC DERMITT C NR MC DERMITT, NV	HEAVENLY VALLEY CREEK AT 8800 FT HEAVENLY VALLEY CREEK AT 8160 FT C HEAVENLY VALLEY CREEK AT 8120 FT HEAVENLY VALLEY CREEK AT 8000 FT C HEAVENLY VALLEY CREEK AT 7960 FT C	HEAVENLY VALLEY CREEK AT 6440 FT C HEAVENLY VALLEY FRONT NO 1 CA HEAVENLY VALLEY FRONT NO 2 CA HEAVENLY VALLEY FRONT NO 3 CA HEAVENLY VALLEY FRONT NO 4 CA	HEAVENLY VALLEY FRONT NO 5 CA HEAVENLY VALLEY FRONT NO 6 CA HEAVENLY VALLEY FRONT NO 7 CA HEAVENLY VALLEY FRONT NO 8 CA
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LONGITUDE		195713 195740 1200728 1200710	1201011 1195840 1200925 1200940 1200942	1200930 1200825 1200850 1200700	1200650 1200440 1200440 1200054	1195923 1195730 1195611 1195600	195620 195638 195523 195520	195650 195730 195725	
LATITUDE		385401 385422 390042 390110 390811	390812 385556 390755 390620	390445 390405 390345 390305	385705 385600 385525 384807	385522 385505 385758 385815 390355	390515 391425 391510 391530	391627 391435 391540 391505	
STATION NAME AND LOCATION		COLD CREEK UPSTREAM CA COLD C AT PIONEER TRAIL CA LONELY GULCH BELOW RESERVOIR CA LONELY GULCH AT VICTORIA DR CA WARD CREEK CA	WARD CREEK CA TROUT C AT S LAKE TAHDE CA WARD C AT HWY 89 CA BLACKWODD C AT HWY 89 CA MADDEN C AT HOMEWOOD CA	HOMEWOOD C AT HOMEWOOD CA MCKINNEY C AT HWY 89 MCKINNEY C AT CASCADE DR CA GENERAL C AB HWY 89 MEEKS C AT MEEKS BAY CA	EAGLE C AB HWY 89 TALLAC C AT HWY 89 UPPER TALLAC C AB HWY 89 GRASS LAKE C NR MEYERS CA UPPER TRUCKEE R NR MEYERS CA	UPPER TRUCKEE R AT S LK TAHDE CA HEAVENLY VALLEY C AT PIDNEER TRAIL EDGEWOOD C AT HWY 50 NV BURKE C AT HWY 50 NV LOGAN HOUSE C AB HWY 50 NV	GLENBROOK C AT GLENBROOK NV INCLINE C AT INCLINE VILLAGE NV INCLINE C AT SKI INCLINE NV INCLINE C AT TYROLEAN VILLAGE NV THIRD C AT LAKESHORE BLVD NV	THIRD C AT HWY 27 NV WOOD C AT LAKESHORE BLVD NV WOOD C AT HWY 27 NV SECTION C AT SILVERTIP DR NV	
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. STATION NAME AND LOCATION	WATSON C AT HWY 28 CA DOLLAR C NR TAHOE CITY CA BURTON C AT HWY 28 CA FIRST C AT HWY 28 NV STREAM FROM OLD MEYERS DUMP	TH END OF OLD MEYERS DUMP BSTATION N. OF OLD MEYERS DUMP VE JUNCTION WITH UN-NAMED CR. OF POWER SUB-STATION GRASS LAKE CREEK NEAR MEYERS CALIF	UPPER TRUCKEE RIVER AT SOUTH LAKE TAHOE CALIGLEN ALPINE CREEK NR MEYERS EAGLE CREEK NEAR CAMP RICHARDSON CALIF MEEKS C AT MEEKS BAY CALIF OUAIL LAKE CREEK AT HOMEWOOD CALIF	MADDEN CREEK NR HOMEWOOD CALIF MADDEN CREEK AT HOMEWOOD CALIF BLACKWOOD CREEK NR TAHOE CITY CALIF WARD CREEK NR TAHOE PINES, CALIF WARD CREEK RRIBUTARY NEAR TAHOE PINES, CALIF	WARD CREEK LOOP ROAD TRIBUTARY NR TAHOE PINE WARD CREEK AT HY 89 NEAR TAHOE PINES, CALIF DOLLAR CREEK NR TAHOE CITY CALIF FIRST C NR CRYSTAL BAY, NV SECOND C NR CRYSTAL BAY, NV	WOOD C NR CRYSTAL BAY, NV WOOD C AT MOUTH NR CRYSTAL BAY, NV THIRD C AT INCLINE VILLAGE, NV THIRD C NR CRYSTAL BAY, NV INCLINE C NR CRYSTAL BAY, NV	GLENBRDOK C AT GLENBROOK, NV TROUT CREEK NR TAHOE VALLEY CALIF TROUT CREEK AT SOUTH LAKE TAHOE CALIF 89 ED 1.70	
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LATITUDE	390104 390209 390221 390244 390350	391546 391533 391550 391531 391529	391554 391806 391805 391714 391643	391706 391804 391740 391711	391653 391654 391651 391651 391651	391646 391633 391635 391633	391624 391524 391549 391559	
STATION NAME AND LOCATION	89 ED 1.94 89 ED 2.99 89 ED 2.21 89 ED 2.44 28 PL 3.50	GAUGE 2 PEAST FORK BELOW SAWMILL PIPE SAWMILL VALVE CULVERT UNDER SAWMILL FLAT ROAD BELOW DAM SPILLWAY	DRAINAGE FROM DAM ROAD MIDDLE FORK MARTIS ABOVE MARTIS MARTIS CREEK ABOVE WEST MARTIS SMALL CREEK AT BASOUE DRIVE SMALL CREEK AT NORTHSTAR DRIVE	GAUGE 4 WEST MARTIS ABOVE MARTIS GAUGE 3 WEST MARTIS AT BASQUE DRIVE W. MARTIS BELOW NORTHSTAR DRIVE	ROCK LINED DRAINAGE DITCH 1 ROCK LINED DRAINAGE DITCH 2 ROCK LINED DRAINAGE DITCH 3 ABOVE ROCK LINED DRAINAGE DITCH DRAINAGE FROM UNIT 18	TRAPEZOIDAL WEIR VILLAGE CULVERT PARKING LOT DROP INLET 1 PARKING LOT DROP INLET 3 WEST FORK ABOVE VILLAGE CULVERT	DRAINAGE FROM T1 LIFT WEST FORK ABOVE T1 DRAINAGE GAUGE 1 NEW DRAINAGE NEAR 313 SPRINGS	
HYDROLOGIC Unit Code	16050101 16050101 16050101 16050101	16050102 16050102 16050102 16050102 16050102	16050102 16050102 16050102 16050102	16050102 16050102 16050102 16050102	16050102 16050102 16050102 16050102 16050102	16050102 16050102 16050102 16050102	16050102 16050102 16050102 16050102	

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3TAT2	900		006 006 032 032	032 032 032 032	032 006 032 032	006 032 032 032	032 032 032 032	032 032 032	
LONGITUDE	1200747 1200748 1200159		1200700 1201407 1200159 1195155	1191835 1192625 1200711 1191609 1192010	1192255 1194920 1194625 1194210	1195000 1191840 1194225 1190415	1190625 1193030 1190550 1184814	1171440 1144115 1181210 1154345	
LATITUDE	391529 391530 392541	9 9	392554 392554 392541 393235 393105	393625 393505 391810 393819 394640	394530 384630 384845 385050	384610 391730 391055 393215	382630 383740 390910 385200	385315 391205 375000 390900	
STATION NAME AND LOCATION	MAIN DRAINAGE AT HALFWAY HOUSE WEST OR C DRAINAGE AT HALFWAY P TRUCKEE.R AT FARAD		MARTIS CREEK NEAR TRUCKEE CA 2 SAGEHEN CREEK NR TRUCKEE CALIF 2 TRUCKEE R AT FARAD. CA 2 PEAVINE C NR RENO, NV 2 TRUCKEE R AT VISTA, NV	TRUCKEE CA AT WADSWORTH NV TRUCKEE R BL DERBY DAM NR WADSWORTH, NV MARTIS CR AT HWY 267,CA TRUCKEE R AT WADSWORTH, NV TRUCKEE R NR NIXON, NV	W WALKER R NR WELLINGTON NV WF CARSON R RTE 89 BRIDGE WF CARSON R NR HWY 88 IN CA E F CARSON R NR GARDNERVILLE, NV FY77 REESTABLISH OWDC 51089	1 W F CARSON R AT WOODFORDS, CA CARSON R NR FORT CHURCHILL, NV CARSON R NR NEW EMPIRE NV 3 TRUCKEE CA NR HAZEN, NV 3 TRUCKEE CA NR HAZEN NV	1 E WALKER R AB DIVERSION TO TOPAZ L 2 W WALKER R AB DIVERSION TO TOPAZ L 3 WALKER R NR WABUSKA, NV 3 WALKER R BL SCHURZ NV 4 COTTONWOOD C NEVADA	S TWIN R NR ROUND MOUNTAIN, NV STEPTOE C NR ELY, NV CHIATOVICH C NR DYER, NV WHITE SAGE	
HYDROLOGIC Unit Code	16050102 16050102 16050102	16050102 16050102	16050102 16050102 16050102 16050102	16050102 16050102 16050102 16050103 16050103	16050103 16050201 16050201 16050201	16050201 16050202 16050202 16050203 16050203	16050301 16050302 16050303 16050303	16060004 16060008 16060010	

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STATION NAME AND LOCATION	PACIFIC NORT	ROGUE RIVER NEAR AGNESS,OREG. JOHN DAY R AT MCDONALD FERRY,OREG. TUALATIN RIVER AT WEST LINN,OREG. DEER C II	DEER C IV DEER C V FY76 CHANGE OPERATION OWDC54193 TO ALSEA R NR TIDEWATER OR SIMILKAMEEN R - INT BDY	FY77 CHANGE OPERATION OWDC51913 TO FY77 CHANGE OPERATION OWDC51915 TO HAYDEN CREEK SF PALOUSE R AT MOSCOW ID OWYHEE R BL OWYHEE DAM	FY77 REESTABLISH OWDC 66891 FY77 CHANGE OPERATION OWDC51071 TO PORTNEUF R BL MARSH C ID ROCK C AT ROCKLAND ID LYNX CREEK KN4002 <	KOOTENAI RIVER NEAR REXFORD, MT. KOOTENAI RIVER BL LIBBY DAM, NEAR LIBBY, MT. FISHER RIVER NEAR LIBBY, MT. ROSS CREEK NEAR TROY MT FISHER RIVER ABOVE WOLF CREEK, NEAR LIBBY, M	WOLF CREEK NEAR LIBBY, MT. BALL CREEK NEAR BONNERS FERRY, IDAHO KOOTENAI RIVER NR COPELAND, ID AMBROSE CREEK MIDDLE FK ROCK CR NR POTATO L&S	ROCK CR BL WEST FORK ROCK CREEK ALDER CR AT MOUTH EAST FK ROCK CR BL E FK RESERVR GRIZZLY CRK NR MOUTH
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STATION NAME AND LOCATION	MEADOW CR BL DRY GULCH		WELCOME CRK AT MOUTH WEST FK ROCK CR AT WEST FK GS WILLOW CRK NR SLIDEROCK MIN	WYMAN CR AT MOUTH S F FLUME LOWER WILLOW C NR HALL N F FLUME LOWER WILLOW C NR HALL OUTFLOW FLUME L LOWER WILLOW C BLACKFOOT RIVER NEAR LINCOLN, MT.	BLACKFOOT RIVER BL ALICE CREEK, NR LINCOLN, FLATHEAD BRITISH COLUMBIA BIG CREEK RATTLESNAKE CREEK WEST FORK BITTERROOT	DEER CREEK HUGHES CREEK OVERWHICH CREEK SLATE CREEK WEST FORK BITTERROOT	WEST FORK BITTERROOT NEZPERCE FORK NEZPERCE FORK BOULDER CREEK	PIQUETT CREEK WEST FORK BITTERROOT RIVER MOOSE CREEK MARTIN CREEK	
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STATION NAME AND LOCATION		RYE CREEK NORTH FORK RYE CREEK CHAFFIN CREEK SLEEPING CHILD C SLEEPING CHILD C LITTLE SLEEPING CHILD CREEK	SOUTH FORK SKALKAHO DALY CREEK SKAIKAHO CREEK BLODGETT CREEK WILLOW CREEK	BURNT FORK CREEK GOLD CREEK KOOTENAI CREEK EIGHTMILE CREEK M F FLATHEAD RIVER NEAR WEST GLACIER, MT.	FLATHEAD RIVER AT COLUMBIA FALLS, MT. FLATHEAD RIVER NEAR KALISPELL, MT THOMPSON RIVER NEAR MARION, MT. THOMPSON RIVER NEAR MARION, MT.	THOMPSON R AB L THOMPSON R NR THOMPSON FALLS THOMPSON R AB L THOMPSON R NR THOMPSON FALLS. M LITTLE THOMPSON RIVER NEAR THOMPSON FALLS. M LITTLE THOMPSON RIVER NEAR THOMPSON FALLS. WEST FORK THOMPSON FALLS.	WEST FORK THOMPSON RIVER NR THOMPSON FALLS, THOMPSON RIVER NEAR THOMPSON FALLS, MT. THOMPSON FALLS, MT.	
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LATITUDE	482200 482200 482512 48131	1 6 6 4 6 4	470800 471700 471500 470300	474922 475018 485521 482604	481841 481732 481027 480859 480434	480250 480104 475823 475618 485853	485904 480328 480706	
STATION NAME AND LOCATION	PACK RIVER NEAR COLBURN, IDAHO PRIEST RIVER NEAR PRIEST RIVER, IDAHO	S FK CDEUR D'ALENE RIVER AT KELLOG3 ID S FK CDEUR DALENE R AT SMELTERVILLE, IDAHO ST. JOE R AT ST MARIES IDAHO SHERLOCK CREEK AT MOUTH QUARTZ CREEK AT FR 218 BRIDGE	SIMMONS CREEK AT FR 218 BRIDGE ST JOE RIVER AT CALDER, IDAHO ST JOE RIVER AT HOYT FLAT ST JOE RIVER AT RED IVES ST. MARIES RIVER NEAR SANTA IDAHO	HAYDEN CK'BELOW N FK, NR HAYDEN LAKE, IDAHO SPOKANE RIVER AT LONG LAKE, WASH COLUMBIA RIVER AT NORTHPORT, WASH. BARNABY CREEK NR. RICE LITTLE JIM CREEK NR. DAISY	HALL CREEK AT INCHELIUM, WASH. STRANGER CREEK AT INCHELIUM NEZ PERCE CREEK NR. KEWA FALLS CREEK NR. KEWA	NINEMILE CREEK NR. FRUITLAND LITTLE NINEMILE CREEK NR. FRUITLAND SIXMILE CREEK NR. MILES THREEMILE CREEK NR. MILES KETTLE RIVER NEAR FERRY, WASH.	KETTLE RIVER NEAR LAURIER, WASH. KETTLE RIVER NR BARSTOW, WASH. SHEEP CREEK AT SPRINGDALE, WASH. DEER CREEK NEAR VALLEY, WASH.	
HYDROLOGIC Unit Code	17010214 17010214 17010214	17010302 17010302 17010304 17010304	17010304 17010304 17010304 17010304	17010305 17010307 17020001 17020001	17020001 17020001 17020001 17020001	1702001 1702001 1702001 1702001	17020002 17020003 17020003	

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LATITUDE	481700 482758 482805 483844 483837	482838 482826 482718 482733 482619	482455 481839 481540 481325 481019	480812 480628 480620 480504 480454	480416 480355 480301 480147 480033	480026 480042 481328 481234 481047	481035 480955 480723 480738	
STATION NAME AND LOCATION	CHEWELAH CREEK AT CHEWELAH, WASH. LITTLE PEND OREILLE RIVER NEAR COLVILLE, WAS HALLER C NR ARDEN WASH MILL CREEK NEAR COLVILLE, WASH. SANPOIL R AB THIRTEENMILE CR NR REPUBLIC WA	THIRTEENMILE CREEK NR. REPUBLIC LDST CREEK NR. DISAUTEL GDLD CREEK NR. REPUBLIC W F SANPOIL RIVER NR REPUBLIC, WASH SEVENTEENMILE CREEK NR. REPUBLIC	NINETEENMILE CREEK NR. REPUBLIC NORTH NANAMKIN CREEK NR. KELLER THIRTYMILE CREEK NR. KELLER BRIDGE CREEK AT MOUTH NR. KELLER CACHE CREEK NR. KELLER	IRON CREEK NR. KELLER SANPOIL R NR KELLER, WASH BRUSH CREEK NR. KELLER SANPOIL R ABV JACK CR AT KELLER, WASH JACK CREEK AT KELLER	COPPER CREEK NR. KELLER MEADOW CREEK NR. KELLER SILVER CREEK NR. KELLER JOHN TOM CREEK NR. KELLER DICK CREEK NR. KELLER	MANILA CREEK NR. KELLER PETER DAN CREEK AT ELMER CITY MILL CREEK NR. NESPELEM MILL CREEK NR. NESPELEM NESPELEM CANAL NR. NESPELEM	NESPELEM RIVER AT NESPELEM, WASH. NESPELEM R BLW MILLPOND AT NESPELEM, WASH LITTLE NESPELEM RIVER NR. NESPELEM MESPELEW GIVED AT MOUTH NR. NESPELEM	
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STATION NAME AND LOCATION	REEK NR. NESPELEM R USGS STA NR TONAS R CNTY RD BR ELLIS	TONASKEI CKEEK AI OROVILLE, WASH. OKANDGAN R AT OROVILLE BONAPARTE CREEK NEAR WAUCONDA, WASH. OKANDGAN RIVER NEAR TONASKET, WASH. WANNACOTT CREEK NR. OMAK OMAK CREEK NEAR OMAK, WASH.	KARTAR CREEK NR. OMAK NO NAME CREEK NR. OMAK NO NAME CREEK AT MOUTH NR. OMAK OMAK CREEK AT OMAK	TOATS COULEE CREEK NEAR LOOMIS, WASH. SIMILKAMEEN RIVER NR NIGHTHAWK WASH ANDREWS CREEK NEAR MAZAMA, WASH. BEAVER CREEK BELOW SOUTH FORK, NEAR TWISP, W	STEHEKIN RIVER AT STEHEKIN, WASH. LOWER CRAB C AT SEC 3J15N23E RB4C AT SEC 28 17N 23E OD WASTEWAY AT WEST CANAL W35.9 B WASTEWAY AT END	D72-141 DRAIN AT WHITE TRAILS ROAD ENTIAT RIVER NEAR ARDENVOIR, WA. WHITE RIVER NEAR PLAIN, WASH. WENATCHEE RIVER AT PLAIN, WASH ICICLE CREEK ABOVE SNOW CREEK, NEAR LEAVENWO	WENATCHEE RIVER AT PESHASTIN, WASH. MISSION CREEK ABOVE SAND CREEK NEAR CASHMERE WENATCHEE RIVER AT MONITOR, WASH. ROCKY FORD CR AT RT 17	
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STATION NAME AND LOCATION	CDAL CREEK AT MOHLER, WASH. CRAB CREEK AT IRBY, WASHINGTON WILSON CREEK BE. CORBETT DRAW, NR. ALMIRA, W WILSON CREEK T WILSON CREEK, WASH.	POTHOLES CANAL AT MILE O.2 LIND COULEE AT RT 17 CROSSING W645 DRAIN IN SEC 34 18N 25E EL63.8 W W AT END WINCHESTER W W AT 17/27-3D	CRAB C LAT AT CRAB C W W W CA AT FRENCHMAN HILLS W W CRAB CR AT CO RD 7N BRIDGE FR HILLS W W AT SEC 9 17N/27E DW239B DRAIN AT W CA	DPE 215 AT ROUTE 26 LOWER CRAB C AT MC MANNAN ROAD RCD W W AT D SULLIVAN RD CROSSING DCC1 AT RED ROCK COULEE ROAD CCL WASTEWAY AT UNIT 88 BLOCK 88	EL 25 A W W AT PUMPING PLANT W645 DRAIN AT COUNTY ROAD R NW PE16.4M12 WASTEWAY AB DPE215 D46-179 DRAIN AT GILLIS ROAD CRAB CREEK NEAR MOSES LAKE, WASH.	RDCKY FORD CREEK NEAR EPHRATA, WASH FARRIER CDULEE NEAR SCHRAG, WASH. CRAB CR NR BEVERLY, WASH SURFACE RUNOFF FROM BLOCK 1 BELOW EL 85 M WW	ESO COULEE WEST OF CONNELL ESO COULEE BELOW EL 85 Z WW ESO COULEE BELOW D 18-97 DRAIN ESQ COULEE SR-17 OVERPASS
HYDROLOGIC Unit Code	17020013 17020013 17020013 17020013	17020015 17020015 17020015 17020015	17020015 17020015 17020015 17020015	17020015 17020015 17020015 17020015	17020015 17020015 17020015 17020015	17020015 17020015 17020015 17020016	17020016 17020016 17020016 17020016

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LATITUBE	463505 1 463500 1 46340 1 463240 1	462730 1 462730 1 462530 1 462445 1	462220 1 462115 1 462045 1 462005 1	462015 1 462100 1 462140 1 462645 1 462910 1	462050 1 461400 1 462500 1 461300 1	464324 1 463526 1 462317 1 463020 1	463131 1 462707 1 462131 1 464348 1	
STATION NAME AND LOCATION	ESO COULEE BELOW DPE 38 B DRAIN ESO COULEE BELOW DPE 38 DRAIN ESO COULEE BELOW PE 38 WW ESO COULEE BELOW PE 38.9 E WW ESO COULEE BELOW PE 38.9P2 WW	ESQ COULEE ELTOPIA GAGING STATION ESQ COULEE BELOW ELTOPIA B CA WW ESQ COULEE BELOW EB 8 WW ESQ COULEE BELOW PE 38.985 WW ESQ COULEE BELOW PE 59 WW	ESQ COULEE BELOW DIVERSION STR ESQ DIV CA BELOW EB 15 WW ESQ DIV CA BELOW PE 59.4 D WW ESQ DIV CA BELOW PE 59.4 WW ESQ DIV CA BELOW PE 59.4 K WW	ESQ DIV CA BELOW PE 59.4 WW ESQ DIV CA BELOW PE 66 M WW ESQ DIV CA BL P P LAT CROSSING ABANDONED PE 47 J WW BLK 15 S OF ABANDONED RINGOLD WW	ABANDONED PE 65 WW COYOTE DR - AMON WW NR KENNEWICK W ROZA CA AT MILE 44.2 NR GRANGER WA CHANDLER CA MI 2.8 NR PROSSER WA SCODTENEY W W AT SCOOTENEY RE	POTHOLES E CA AT MILE 26.6 POTHOLES E CA AT MILE 38.0 POTHOLES E CA AT MILE 65.8 PE 16.4 W AT OUTLET COL R WB5 LAT AT HEAD	WB5G LAT AT WB5G W W ELTOPIA B CA AT E B W W ESQUATZEL DIV CHANNEL AT END ELG8D WW AT RT 17	
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LONGITUDE	1191648 1190030 1191028	ന നയയനന	1202929 1202825 1205656 1203058	1202947 1203002 1203135 1202858 1202850	1203000 1212006 1211208 1210400 1205655	1205136 1202847 1203025 1203025 1202844	1210140 1203511 1204205 1211930	
LATITUDE	463212 463435 463435 464604	463824 461846 464920 463931 462745	464041 463622 471133 470133 465843	465538 465536 465537 465122 465710	470440 471917 471541 471441 471135	471448 470737 465504 465504	471320 463755 463522 464730	
STATION NAME AND LOCATION	WBS WW 1 AT COLUMBIA RIVER ESQUATZEL CHANNEL AT SHEFFIELD RD D15-146 DRAIN AT BELLEVUE DRIVE PF16 4 WW AT ADAMS CHINTY ITNE	COLUMBIA R AT VERNITA BR N COLUMBIA RIVER AT RICHLAND PROVIDENCE COULEE AT CUNNI ESQUATZEL COULEE AT CONNEL ESQUATZEL COULEE AT ELTOPI FY76 REESTABLISH OWDC 5420	YAKIMA R AT HARRISON RD BRIDGE YAKIMA R AT TERRACE HGTS. BRIDGE YAKIMA R AT CLE ELUM WILSON C AT SANDERS RD WILSON C AT DAMMON RD	WIPPLE WW AT THRALL RD WILSON C AT THRALL RD YAKIMA R AT ELLENSBURG YAKIMA R AT UMTANUM COLEMAN C NW 1/4 SEC 20 17N 19E	KITTITAS CA SE1/4 SECG 18N 19E YAKIMA RIVER NEAR MARTIN, WASH. KACHESS RIVER NEAR EASTON, WASH. CLE ELUM RIVER NEAR ROSYLN, WASH. YAKIMA RIVER AT CLE ELUM, WASH.	TEANAWAY RIVER BELOW FORKS, NR. CLE ELUM, WA NANEUM CREEK NEAR ELLENSBURG, WASH. WILSON C AT THRALL WA WILSON CREEK AT THRALL, WASH. YAKIMA R AT UMTANUM WASHINGTON	FANHOUSE NO. 3 NR ROSLYN, WASH NACHES R AT NELSON BRIDGE WIDE HOLLOW C NR GROMORE DEEP CR NR GOOSE PRAIRIE WASH.	
HYOROLOGIC Unit Code	17020016 17020016 17020016	17020016 17020016 17020016 17020016 17020016	17030001 17030001 17030001 17030001	17030001 17030001 17030001 17030001	17030001 17030001 17030001 17030001	17030001 17030001 17030001 17030001	17030001 17030002 17030002 17030002	-

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OW END RABY	197 197 196 197	197 197 197	197 197 197	197				
OW BEGIN	1969 1962 1969 1969	1968 1968 1968 1968	1968 1968 1970 1968	1968 1968 1974 1974	1974 1974 1974 1974	1974 1974 1974 1974	1974 1974 1971 1974	
BASIN DESCRIPTOR	014 004 004 124							
	70.70 78.90 3.91 39.00							
DRAINAGE AREA	70. 78. 3. 239. 941.							
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LONGITUDE	1211729 1210449 1210010 1204605	1201100 1193500 1201400 1202100 1203100	1203400 1202834 1194600 1200800	200800 200800 200900 202614 203156	1202828 1202818 1195845 1195851 1200108	200031 195959 210104 210109	200205 1201147 195954 201500	
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LATITUDE	465222 465839 464033 464016 464444	162000 161600 161900 161900 162100	62500 63126 61300 62100 62100	62300 62300 61300 63247 63416	163234 163207 161956 161903 161835	51657 51647 51557 51439 51450	161435 162006 161354 162204	
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STATION NAME AND LOCATION	BUMPING RIVER NEAR NILE, WASH. AMERICAN R NR NILE WASH HAUSE CREEK NEAR RIMROCK, WASH. TIETON RIVER AT CANAL HEADWORKS NR NACHES, NACHES RIVER BELOW TIETON RIVER, NEAR NACHE	DID 25 NR GRANGER WA KENNEWICK CA HDWKS NR CHANDLER WA MARION DR AT HWY 22 NR TOPPENISH W MARION DR AT ROB RD NR TOPPENISH W MARION DR AT LAT C NR TOPPENISH WA	NEW RESER CA-DROP 3-NR WAPATO WA NEW RESER CA - HOWKS NR WAPATO WA CHANDLER CA MI O.6 NR PROSSER WA DID 2 NR GRANGER WA DID 2 NR GRANGER WA	DRAIN 27.2 NR GRANGER WA DRAIN 26.6 NR GRANGER WA SUNNYSIDE CA MI 24.7 NR GRANGER WA DRAIN AT BIRCHFIELD RD WIDE HOLLOW C AT W WASHINGTON AV	WIDE HOLLOW C AT UNION GAP STP AHTANUM C AT MOUTH SULPHUR C AT NORTH AV SUNNYSIDE SULPHUR C WW AT FACTORY RD SUNYS DRAIN DID #3 AT S HILL RD	DRAIN DID #3 AT DUFFY RD SULPHUR C WW AT DUFFY RD SULPHUR C WW AT MORSE RD SULPHUR C WW AT MCGEE RD GRIFFIN LAKE INLET	GRIFFIN LAKE OUTLET YAKIMA R AT BRIDGE NR GRANGER YAKIMA R AT BRIDGE NR MABTON E TOPPENISH OR AT WILSON RD	
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DRAINAGE AREA					3479.00 68.90	24.80 173.00 3650.00	
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LONGITUDE	1201348 1201910 1201734 1200757	1194048 1194102 1200100 1200820 1200340	1205206 1205220 1203003 1204713 1205207	1205306 1202435 1200107 1195727	1195328 1194948 1202758 1205510	1205436 1205220 1203003 1202820 1202707	1200222 1195820 1195614 1195529
I ATITUDE	462011 461927 462003 461534 462036	461432 461403 461730 461330	463155 463137 463255 461840 462723	462641 461512 462325 462220 462049	461902 461722 463204 463340 463155	463033 463137 463255 463210 463022	462127 462048 461926 461745
STATION NAME AND LOCATION	SUB-DRAIN 35 AT PARTON RD MARION DR AT HWY 97 WANITY SLOUGH AT MYERS RD SOUTH DR AT HWY 22 NR SATUS GRANGER D AT HWY 223 AB GRANGER	SPRING C AT HESS RD SNIPES C. AT DLD INLAND EMPIRE R DR DID#3 15'AB RENDRNG PLNT OTLT NEQUIST D NW 1/4 SEC 25 9N 21 E SATUS D 302 NW 1/4 SEC 34 9N 22E	NF AHTANUM CR. AT TAMPICO S.F. ANTANUM CR. AT TAMPICO AHTANUM CR. @GDODMAN RD EUNIONGAP TOPPENISH CR. NR FORT SIMCOE NF SIMCOE CR. NR FORT SIMCOE	SF SIMCDE CRK NR FT SIMCDE DRY CREEK NR TOPPENISH ROZA CANAL AT SCOON RD NR SUNNYSIDE WASH ROZA CANAL BLW SULPHUR CR WSTWY NR SUNNYSIDE ROZA CANAL AT BLK CANYON CR NR SUNNYSIDE WAS	ROZA CANAL AT FACTORY RD NR SUNNYSIDE WASH ROZA CANAL AT WILGUS RD NR GRANDVIEW WASH YAKIMA R ABV AHTANUM CR AT UNION GAP WASH NORTH FORK AHTANUM CREEK NEAR TAMPICO, WASH N.F. AHTANUM CR AT TAMPICO	SDUTH FORK AHTANUM CREEK AT CONRAD RANCH, NE S.F. AHTANUM CR AT TAMPICO AHTANUM CR AT GOODMAN RD AT UNION GAP AHTANUM CREEK AT UNION GAP, WASH. YAKIMA R AT PARKER	SUNNYSIDE CANAL AT MAPLE GROVE RD NR SUNNYSIDE CANAL BLW SULPHUR CR WSTWY NR SUNN SUNNYSIDE CANAL AT EDISON RD NR SUNNYSIDE WASUNNYSIDE CANAL AT BETHMAY RD MR GRAMDVIEW,
HYDROLOGIC Unit Code	17030003 17030003 17030003 17030003 17030003	17030003 17030003 17030003 17030003	17030003 17030003 17030003 17030003	17030003 17030003 17030003 17030003	17030003 17030003 17030003 17030003	17030003 17030003 17030003 17030003	17030003 17030003 17030003 17037003

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BASIN Descriptor	024	024 024 024 024	024 123 123 004 124	004 124 014				
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LATITUBE	461532 461832 462723 462723	461512 461929 461724 461700 461658	461503 461353 461513 432708 431147	430835 433645 433645 424818 424330	425028 434 138 432556 432556	432621 432626 432631 432656 432713	432753 432753 432808 432814	
STATION NAME AND LOCATION	SUNNYSIDE CANAL AT GRANDVIEW WASH TOPPENISH CREEK NEAR FT. SIMCDE, WASH. N.F. SIMCDE CR NR FT SIMCDE SF SIMCDE CR NR FT SIMCDE TOPPENISH CR NR SATUS, WASH	DRY CR NR TOPPENSIH DID 18 DRAIN AT SUNNYSIDE WASH BLACK CANYON CR AT WANETA RD NR SUNNYSIDE, WA DID 9 DRAIN NR SUNNYSIDE WASH DID 3 DRAIN NR SUNNYSIDE WASH	SULPHUR CR WASTEWAY NR SUNNYSIDE WASH YAKIMA RIVER AT MABTON, WASH. YAKIMA RIVER AT KIONA, WASH CACHE CREEK NEAR JACKSON, WYO.	GREYS RIVER AB RESERVOIR NR ALPINE WY SNAKE R NR HEISE ID SNAKE RIVER NR HEISE, IDAHO MILL CR100YD ABV.FOREST BNDY SWIFT CREEK NEAR AFTON, WYO.	SALT R NR AUBURN WYO SPOIL BANKS DRAIN AT EAGLE, IDAHO DRAIN WELL INFLOW 1N-38E-7ACC1 DRAIN WELL INFLOW 1N-38E-7BD01 DRAIN WELL INFLOW 1N-38E-7BD01	GERMAN CANAL 1N-38E-7BBB1 DRAIN WELL INFLOW 1N-37E-4CCC1 DRAIN WELL INFLOW 1N-37E-5DCB1 DRAIN WELL INFLOW 1N-38E-6ACB1 DRAIN WELL INFLOW 2N-38E-32DDC1	DRAIN WELL INFLOW 2N-38E-31ABC1 DRAIN WELL INFLOW 2N-37E-33BCB1 DRAIN WELL INFLOW 2N-37E-27DDC1 DRAIN WELL INFLOW 2N-37E-26CDB1	
HYDROLOGIC Unit Code	17030003 17030003 17030003 17030003	17030003 17030003 17030003 17030003	17030003 17030003 17030003 17040103	17040103 17040104 17040105 17040105	17040105 17040201 17040201 17040201	17040201 17040201 17040201 17040201	17040201 17040201 17040201 17040201	

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SUSP OISCHARGE	-	4 4	4 4		44 4	4 m	-বৰৰ	4
32IS TRAY TAM G38								
SUSP PART SIZE					, <del></del>			
POZE ZED CONCEN		44444	44444	44444	44444	44444	44444	4444
OW END YEAR		1972 1972 1972 1972 1972	1972 1972 1972 1973	1973 1973 1972 1972	1973 1972 1972 1973	1973 1972 1972 1972 1973	1973 1973 1972 1972	1972 1972 1972 1972
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BASIN Descriptor								
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LATITUDE		432833 432834 432836 432846 432853	432854 432856 432856 432858	432922 432923 432923 432934 432943	432948 432948 432948 432953 432959	433002 433003 433013 433015 433015	433041 433041 433114 433120	433130 433133 433134 433145
STATION NAME AND LOCATION		DRAIN WELL INFLOW 2N-38E-30ADC1 DRAIN WELL INFLOW 2N-38E-28ACC1 DRAIN WELL INFLOW 2N-37E-27BCC1 DRAIN WELL INFLOW 2N-37E-26BBD1 DRAIN WELL INFLOW 2N-37E-26BBD1	DRAIN WELL INFLOW 2N-37E-27BBA1 DIVERSION DITCH 2N-37E-27BBA2 DRAIN WELL INFLOW 2N-37E-30BBB1 DRAIN WELL INFLOW 2N 38E 20DCC1 DRAIN WELL INFLOW 2N-38E-20DAD1	DRAIN WELL INFLOW 2N-37E-24CBB1 DRAIN WELL INFLOW 2N-38E-19ACC1 DRAIN WELL INFLOW 2N-37E-21ACC1 DRAIN WELL INFLOW 2N 38E 20ADA1 DRAIN WELL INFLOW 2N 38E 20ADA1	DRAIN WELL INFLOW 2N-37E-14CDC1 DRAIN WELL INFLOW 2N-37E-14CDC2 DRAIN WELL INFLOW 2N-37E-15DCD1 DRAIN WELL INFLOW 2N-37E-14DDD1 DRAIN WELL INFLOW 2N-37E-14DDD1	DRAIN WELL INFLOW 2N-38E-17CBC1 DRAIN WELL INFLOW 2N 37E 13CBC1 DRAIN WELL INFLOW 2N-37E-15DAB1 DRAIN WELL INFLOW 2N-37E-14BCC1 DRAIN WELL INFLOW 2N-37E-14BCC1	DRAIN WELL INFLOW 2N-39E-7CDC1 DRAIN WELL INFLOW 2N-38E-18BAB1 DRAIN WELL INFLOW 2N-37E-10BDA1 DRAIN WELL INFLOW 2N-37E-11BAD1 DRAIN WELL INFLOW 2N-37E-11BAD1	DRAIN WELL INFLOW 2N-37E-11ABA1 DRAIN WELL INFLOW 2N-37E-2CDD1 DRAIN WELL INFLOW 2N-37E-2DCD1 DRAIN WELL INFLOW 2N-37E-2DCB1
HYDROLOGIC Unit Code		17040201 17040201 17040201 17040201	17040201 17040201 17040201 17040201	17040201 17040201 17040201 17040201	17040201 17040201 17040201 17040201	17040201 17040201 17040201 17040201	17040201 17040201 17040201 17040201	17040201 17040201 17040201 17040201

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LONGITUDE		1120425 1120432 1120123 1120123	1120334 1120156 1115858 1120400 1115934	1120347 1115822 1120832 1120406 1121037	1112352 1111554 1111707 1114020	1114150 1111400 11112645 1113330	1111230 11113655 1111230 11113655 11113655	1114301 1114525 1114637 1114901	
LATITUDE		433145 433158 433354 433432 433518	433535 433550 433613 433617 433643	433646 433701 433702 433704 434806	442511 443013 442906 435800 440300	435339 435620 434930 435045 435400	434654 435540 434654 435538	435306 435313 435257 435310	
STATION NAME AND LOCATION		DRAIN WELL INFLOW 2N-37E-2CDA1 DRAIN WELL INFLOW 2N-37E-2BDC1 DRAIN WELL INFLOW 3N-38E-29BBC1 DRAIN WELL INFLOW 3N-38E-20BCC1	GREAT WESTERN CANAL 3N-37E-13BCA1 DRAIN WELL INFLOW 3N-38E-7DCC1 DRAIN WELL INFLOW 3N-38E-10CBB1 DRAIN WELL INFLOW 3N-37E-11ADC1 DRAIN WELL INFLOW 3N-37E-11ADC1	DRAIN WELL INFLOW 3N-37E-2DDD1 DRAIN WELL INFLOW 3N-38E-3DBC1 DRAIN WELL INFLOW 3N-37E-6DAD1 DRAIN WELL INFLOW 3N 37E O2DBA1 DRAIN WELL INFLOW 6N-36E-35DAD1	HENRYS F BLW ISLAND PARK RE ID THIRTY CR AT BIG SPR NR MACKS INN ID MOOSE CREEK NEAR BIG SPRINGS HENRYS FORK AT ST ANTHONY ID NF SQUIRREL C NR SQUIRREL ID	A BITCH CR 1/4 MI US HWY 32 X-ING BITCH CR 1/4 MI US HWY 32 X-ING SF TETON R SH 33 X-ING CANYON C 1000 FT US SH 33 X-ING TETON R 1 MI BELOW DAMSITE	TETON R NR DRIGGS ID TETON R NR ST ANTHONY ID TETON RIVER AB LEIGH CREEK NR DRIGGS ID TETON R NR ST ANTHONY IDAHO NORTH FK TETON R AT TETON, ID	N FK TETON R AT POWERLINE RD ID N FK TETON R AT SUGAR DETOUR BR ID N FK TETON R AT SALEM HWY BR ID N FK TETON R AT LAST BR ID	
HYDROLOGIC Unit Code		17040201 17040201 17040201 17040201	17040201 17040201 17040201 17040201	17040201 17040201 17040201 17040201	17040202 17040202 17040203 17040203	17040203 17040204 17040204 17040204	17040204 17040204 17040204 17040204	17040204 17040204 17040204 17040204	

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LATITUDE	432700 433456 432430 433535 425140	430731 432450 432450 430731 432624	432642 424128 424130 425114 425147	425100 42445 424737 424722 424437	424439 424443 430750 425520	423130 424025 424620 424620 423140	423243 423330 423307 423259	
STATION NAME AND LOCATION	WILLOW C 9M SE OF IONA AT OLD BRDG WILLCREEK BL RIRIE DAM DUTLET WILLOW CR AB RIRIE LAKE NR DZONE IDA WILLOW CREEK NR RIRIE, IDAHO PORTNEUF R AT POCATELLO ID	SNAKE R NR BLACKFOOT ID SNAKE R NR SHELLEY ID SNAKE RIVER NEAR SHELLEY IDAHO SNAKE RIVER NEAR BLACKFOOT IDAHO DRAIN WELL INFLOW 1N-37E-5CCD1	DRAIN WELL INFLOW 1N-37E-6CBC1 STEWART CR ABV. CONF.W/DIAMONDCR DIAMOND CR ABV CONF.W/STEWART CR ANGUS CR 1/2 MI ABV NF BY SHEEP CR. FTBRDG 1.5MI ABV NF BY	ANGUS CREEK NEAR HEADWATERS MABIE CR AT FOREST BOUNDARY BLACKFOOT R BELOW NF BNDY KENDALL CR AT NF BOUNDARY 1/4 MILE ABOVE FOREST BDRY	100 YARDS ABOVE FOREST BDRY. 250 YARDS BELOW FOREST BDRY. BLACKFOOT RIVER NEAR BLACKFOOT, IDAHO PORTNEUF RIVER AT POCATELLO, IDAHO PORTNEUF RIVER AT POCATELLO, IDAHO	MILNER LAKE E OF PP ON S SIDE WALCOTT LAKE, 3 MILES FROM DAM SNAKE R AT NEELEY ID SNAKE RIVER AT NEELEY IDAHO ROCK CR NR ROCKLAND ID	SNAKE R AT HWY 30 BRIDGE NR HEYBURN ID SNAKE R AT BURLEY ID MAIN DRAIN AT MILNER LK NR BURLEY ID SNAKE R BEL MAIN DRAIN NR BURLEY ID	
HYDROLOGIC Unit Code	17040205 17040205 17040205 17040205	17040206 17040206 17040206 17040206	17040206 17040207 17040207 17040207	17040207 17040207 17040207 17040207	17040207 17040207 17040207 17040208	17040209 17040209 17040209 17040209	17040209 17040209 17040209 17040209	

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STATION NAME AND LOCATION	SNAKE R AB MILNER DAM NR MILNER ID F MAIN DRAIN AT CAMP HOLLEY LK NR R IRRIGATION DRAIN NR STARRHS FERRY 10S 22E 18CCB1 CANAL 10S 21E 13ACB1 DRAIN WELL INFLOW	09S 22E 26BBA1 DRAIN WELL INFLOW FROM POND 09S 22E 11DDD1 K MAIN DRAIN AT WASTE WELL 09S 24E 06DDD1 DRAIN WELL INFLOW 09S 24E 06DDB1 DRAIN WELL INFLOW 09S 24E 06DAA3 DRAIN WELL INFLOW	09S 24E O5BCC TRIBUTARY TO F MAIN DRAIN 09S 24E O5BCC F MAIN DRAIN NR RUPERT, IDA 08S 23E 27CCA1 DRAIN WELL INFLOW 08S 25E 29BDD1 DRAIN WELL INFLOW FROM POND 08S 25E 20BDB1 DRAIN WELL INFLOW	08S 25E 20CAD1 DRAIN WELL INFLOW 07S 24E 26DD1 DRAIN WELL INFLOW ROCK CREEK 7 M SOUTH OF HANSEN ROCK C IN PARK NR US HWY #30 N COTTONWOOD C AT 2800 NDRTH	DEEP CREEK AT 3300 NORTH DEEP CREEK NR AUTD WRECKING YARD CEDAR DRAW .5 M FROM MOUTH SNAKE RIVER AB BLUE LAKES SPRING ROCK CREEK NR MOUTH NR TWIN FALLS IDAHO	SNAKE RIVER ABOVE CRYSTAL SPRINGS SNAKE RIVER NEAR BUHL, IDAHO SNAKE RIVER BELOW CLEAR LAKES SPRING MUD CREEK AT MOUTH NEAR BUHL IDAHO SNAKE RIVER ABOVE 1000 SPRINGS NR HAGERMAN I	SNAKE R BL LOWER SALMON FALLS NR HAGERMAN ID SNAKE RIVER AT SHOESTRING RD NR BLISS IDAHO SNAKE RIVER AT KING HILL IDAHO 09S 18E 11BAA1 CANAL DIV	
HYDROLOGIC Unit Code	17040209 17040209 17040209 17040209	17040209 17040209 17040209 17040209	17040209 17040209 17040209 17040209	17040209 17040209 17040212 17040212	17040212 17040212 17040212 17040212	17040212 17040212 17040212 17040212	17040212 17040212 17040212 17040212	

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OW BEGIN	1973 1973 1967 1965	1973 1977 1966 1967 1975	1976 1939 1975 1975	1939 1939 1939 1939	1976 1976 1976 1971 1971	1971 1971 1971 1971	1971 1971 1971 1972
BASIN Descriptor	004	024 024	0004 0004 0004 0004	024 024 024 024			
DRAINAGE AREA	253.00 2630.00	440.00	8.00 37.00 4.80 5.75 6.10	6.50 13.10 22.30 119.00 399.00			
TYPE OF	**************************************	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N	X X X X X X X X X X X X X X X X X X X	SEEEE	X X X X
COUNTY	063 063 073 073 073	001 007 073 027 015	039 015 015 015	015 015 015 015	039 039 039 001	001 027 027 027 027	027 027 027 027
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LATITUDE	425609 425624 424706 424616	431730 414731 425227 425227 433756	433440 435000 434930 434830 434830	434900 435400 435030 434600 433853	432130 432130 432130 433130 433345	433710 433730 434020 434030	433542 4335420 433420 433040
STATION NAME AND LOCATION	OGS 17E OZBBD1 DRAIN WELL INFLOW OSS 17E 35CDB1 DRAIN WELL INFLOW B JACKS CR NR BRUNEAU ID BRUNEAU RIVER NEAR HOT SPRING, IDAHO SNAKE R NR MURPHY ID	SNAKE RIVER NEAR MURPHY, IDAHO SF OWYHEE R AT PETAN RD JORDAN C NR JORDAN VALLEY OREG JORDON CR AB LONE TREE CR NR JORDON VLY OR COTTONWOOD CREEK AT ARROWROCK RESERVOIR ID	GROUSE CREEK NR ARROWROCK DAM ID MOORE CK AB GRANITE CK NR IDAHO CITY ID GRANITE CK NR IDAHO CITY ID BANNOCK CREEK NEAR IDAHO CITY, IDAHO PINE CK AB BARRY PLCR DIV NR IDAHO CITY ID	PINE CK NR IDAHO CITY ID ELK CK AB GOLD HILL PLCR DIV NR IDAHO CITY I ELK CK NR IDAHO CITY ID MODRE CK AB THORN CK NR IDAHO CITY ID MORES CREEK AB ROBIE CREEK NR ARROWROCK DAM	ANDERSON RANCH RES 6 MI AB DAM ANDERSON RANCH RES. 100 YD ABV D S F BOISE R 500 YDS BL DAM TENMILE CR AT CLOVERDALE RD TENMILE CR RIDENBAUGH CROSSING	TENMILE RD AT CHERRY LANE TENMILE CR AT CAN ADA ROAD TENMILE CR NR MOUTH INDIAN CR AT MOUTH INDIAN CR AT AT AV CALDWELL	INDIAN CR AT KARCHER RD NAMPA INDIAN CR AT NAMPA BLVD NAMPA INDIAN CR CENTER SEC26 T3N R2W NEW YORK CA AT LK SHORE DRIVE
HYDROLOGIC Unit CDDE	17040221 17040221 17050102 17050103	17050103 17050105 17050108 17050108	17050112 17050112 17050112 17050112	17050112 17050112 17050112 17050112	17050113 17050113 17050113 17050114	17050114 17050114 17050114 17050114	17050114 17050114 17050114 17050114

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LONGITUDE		1163425 1163420 1163747 1160420 1160745	1161250 1161320 1161530 1161705 1162120	1162410 1162320 1162940 1163705	1164030 1164100 1164105 1163920	1162930 1165300 1164810 1162205 1163750	1164154 1163942 1163712 1164018	1164133 1165437 1170043 1170039	
LATITUDE		433035 433030 434223 433140 433345	433630 433640 433835 433945 434130	434040 434030 434050 434225 434210	434200 434155 434120 434100 434110	433250 434350 434350 434145 434055	433457 433315 433159 433243 433414	434028 434430 434916 434547	
STATION NAME AND LOCATION		RIDEN BAUGH DROP AT NEW YORK CA GARLAND DRAIN N YORK CANAL WILLOW CR AT HWY 44 BOISE RIVER BELOW LUCKY PEAK DAM BOISE R BELOW BÂRBER DAM	RIDENBAUGH DR E END ANN MORRISON BAXTER DR W END ANN M PARK DAVIS DR BELOW GARDEN CITY STP BOISE R AT GLENWOOD BRIDGE EAGLE DR AT EAGLE	FISH HATCHERY OUTFALL NR EAGLE THURMAN DR NR EAGLE BOISE R AT STAR BRIDGE NORTH MIDDLETON DRAIN SOUTH MIDDLETON DRAIN	HARTLEY DR NR CALDWELL (EAST) HARTLEY GULCH NR CALDWELL (WEST) BOISE R AT HWY 30 BRDG CALDWELL MASON DR NR CALDWELL MASON CR NORTH CHANNEL	INDIAN CR AT ROBISON RD DIXIE DR MOUTH NW1/4 S36 T5N R5W CONWAY GULCH W NOTUS HWY 95 DRY CREEK NR EAGLE HWY 44 CROSS MASON CREEK SOUTH CHANNEL	LK LOWELL 1.5 M E BOAT RAMP LK LOWELL NR UPPER EMBANKMENT LK LOWELL SOUTHEAST END LK LOWELL ACROSS FR U.EMBANKMENT LK LOWELL ACROSS FR U.EMBANKMENT LK LOWELL 1M SE GAGE STA LL CANL	INDIAN CREEK & WILDER HWY BRIDGE EAST END DRAIN 1 MI FROM MOUTH SAND HOLLOW DRAIN & 1ST AVE PARM SOUTH BOISE DRAIN MR PARMA, IDAHO	
HYBROLOGIC Unit Code		17050114 17050114 17050114 17050114	17050114 17050114 17050114 17050114	17050114 17050114 17050114 17050114	17050114 17050114 17050114 17050114	17050114 17050114 17050114 17050114	17050114 17050114 17050114 17050114	17050114 17050114 17050114	

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LONGITUDE	1170040	1161100 1161635 1161311 1162205 1162113 1164127	1163816 1163831 1164109 1164022	1165817 1165800 1164420 1170044	1165810 1172030 1162645 1163710	1164300 1164455 1164750 1165525	1162933 1162930 1163600	
LATITUDE	434751	433300 433700 433700 433700 434145 434001	434213 434220 434132 434145 434145 434155	8 8 4 8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9	441422 435730 435615 435245 435345	435715 435710 435850 440235	435139 435030 435500 435036	
STATION NAME AND LOCATION		NEW TORK CA NK BARBER ID COTTONWOOD GULCH AT BOISE ID MOUNTAIN VIEW DR AT BOISE, IDAHO AMERICAN BLVD STORM SEWER AT BOISE ID DRY CREEK AT EAGLE, IDAHO THRUMAN MILL DRAIN NR EAGLE, IDAHO FIFTEEN MILE CR AT MOUTH NR MIDDLETON, IDAHO	MILL SLDUGH AT MOUTH NR MIDDLETON, IDAHO WILLOW CREEK AT MOUTH NR MIDDLETON, IDAHO MASON SLDUGH AT MOUTH AT CALDWELL, IDAHO HARTLEY DRAIN NR CALDWELL, IDAHO MASON CREEK AT MOUTH NR CALDWELL, IDAHO CONWAY GULCH AT MOUTH NR NOTUS, IDAHO	DIAIE SLUUGH AI MUUIH NK PARMA, IDAHU BDISE RIVER NR PARMA IDA WEISER R & WEISER, IDAHO GRAVEYARD WN SAND HOLLOW DRAIN AT MOUTH NR PARMA, IDAHO SNAKE R AT NYSSA OR	WEISER RIVER AT MOUTH, AT WEISER, IDAHO BULLY CREEK NEAR VALE, DREG. PAYETTE R NR EMMETT COMBINE DR AT TUNNEL 7 NW BISSEL CREEK NEAR MOUTH	PAYETTE R NR FALK MAIN DR B LATERAL DR CEMETRAY DR NR NEW PLYMOUTH PAYETTE RIVER NEAR PAYETTE BIG WILLOW CR AT TOM PENCE RANCH	NORTH DRAIN AT HWY #16 NR EMMETT 2 S DRAIN AT LAST CHANCE CA WASTEWAY 2 BISSEL C BETWEEN SEC 28 & 29 2 NORTH DRAIN AT RR NR BRAMWELL	
HYDROLOGIC Unit Code	17050114	17050114 17050114 17050114 17050114 17050114	17050114 17050114 17050114 17050114 17050114	17050114 17050115 17050115 17050115	17050115 17050118 17050122 17050122	17050122 17050122 17050122 17050122	17050122 17050122 17050122 17050122	

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LONGITUDE	33400 3401 35600 43300	62225 62055 65020 60002 55648	2255 2255 2219 2830 2942	2735 2318 3444 2900 2239	2648 2223 3206 3319	63820 164000 64412 64525	164100 162324 163920 163638	
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LATITUDE	435023 435055 435100 435700	435615 435705 440140 444118 445512	445036 445649 445042 445830	444909 444551 445140 444500	444 107 443843 444030 443915 443958	443447 443430 443400 443523 443516	443350 442922 443250 442956	
STATION NAME AND LOCATION	SOUTH DRAIN NR BRAMWELL SMALL DRAIN N OF RR NR BRAMWELL COMBINE DRAIN BL BLACK CANYON PUMP SMALL DR 1/2 MI E GRAVEYARD W W PAYETTE R 0.5 M WEST EMMETT STP	BLACK CANYON RE IN SQUAW CARM SQUAW C AT HWY #52 CROSSING LITTLE WILLOW CAB LWR PAYETTE GOLD FORK NR ROSEBERRY ID LAKE F CR	EF WEISER R WEISER RIVER AT TAMARACK IDAHO EAST FORK WEISER RIVER NEAR STARKEY ID LOST CREEK ABOVE RESERVOIR NEAR TAMARACK IDA WEST FORK WEISER RIVER NR TAMARA	WEST FORK WEISER RIVER NEAR FRUITVALE, IDAHO MILL CREEK NEAR COUNCIL, IDAHO NORTH HORNET CREEK NEAR COUNCIL, IDAHO HORNET CREEK NEAR COUNCIL, IDAHO COTTONWOOD CREEK, AB.DIV., NR. COUNCIL, IDAH	COTTONWOOD CREEK NEAR COUNCIL ID M FK WEISER RIVER AB FALL CREEK NR MESA ID JOHNSON CREEK NEAR GOODRICH, IDAHO DRY CR AT GOODRICH ID GOODRICH CREEK NEAR GOODRICH, IDAHO	WEISER RIVER NR CAMBRIDGE ID RUSH CREEK AT CAMBRIDGE ID SPRING CREEK AT CAMBRIDGE IDAHO PINE CREEK NEAR CAMBRIDGE, IDAHO WEST FORK PINE CREEK NEAR CAMBRIDGE, IDAHO	PINE CREEK AT MOUTH AT CAMBRIDGE IDAHO L. WEISER R. AT RUBY RANCH NR. INDIAN VALLEY LITTLE WEISER RIVER NR MOUTH NR CAMBRIDGE ID DIXIE CREEK NEAR CAMBRIDGE, IDAHO	
HYDROLOGIC Unit Code	17050122 17050122 17050122 17050122	17050122 17050122 17050122 17050123	17050124 17050124 17050124 17050124	17050124 17050124 17050124 17050124	17050124 17050124 17050124 17050124	17050124 17050124 17050124 17050124	17050124 17050124 17050124 17050124	

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ORAINAGE AREA	13.70	. 52. 242.	288.00 1460.00 36.90 53.50 32.00	69200.00	21.40 73300.00 351.00	92960.00 50 <b>5.0</b> 0	240.00 66.20 431.00	
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LONGITUDE	1164953	6313 6315 6315 6305 6370	1164648 1164623 1164803 1165434 1165550	1165848 1164324 1164324 1164212 1170037	1170520 1164150 1174940 1162742 1162617	1165836 1181600 1174920 1175730	1174332 1174707 1174654 1180355	
LATITUOE	443102 444335 4444335	442420 442440 442220 441810 441940	441623 441623 441337 442448 441950	441444 445448 445448 450503 443040	441758 451505 444630 453840 451503	460550 451900 452600 453700 453700	453712 463650 463551 463020	
STATION NAME AND LOCATION	KEITHLY CREEK, AB. DIV., NR. MIDVALE, IDAHO KEITHLY CREEK AT MOUTH NEAR MIOVALE IDAHO BEITHLY CREEK NEAR MIDVALE, IDAHO BEITH OF STAND FOREK, MIDWELE DE TRAUD	CRANE CR AB RES NR CRANE ID HOG CR NR CRANE ID MILL CREEK NR CRANE TENNISON CREEK NEAR SOUTH CRANE SCHOOL, IDAH SOUTH FORK CRANE CREEK NEAR CRANE, IDAHO CRANE CREEK NR MIDVALE IDA	CRANE CREEK AT MOUTH, NEAR WEISER, IDAHO WEISER RIVER NEAR WEISER, IDAHO COVE C NR WEISER ID MANN CREEK ABOVE RESERVOIR NEAR WEISER, IDAH MONROE CREEK ABOVE SHEEP CREEK NEAR WEISER,	SNAKE RIVER AT WEISER, IDAHO WILDHORSE R SE R INDIAN CREEK BL CUPRUM SCOTT CREEK ABOVE DIVERSIONS, NEAR WEISER, I	HOG CREEK NEAR WEISER, IDAHO SNAKE RIVER AT HELLS CANYON DAM ID-OR LINE POWDER RIVER AT BAKER,OREG. KURRY CREEK COPPER CREEK	SNAKE RIVER NEAR ANATONE WASHINGTON GRANDE RONDE RIVER NEAR HILGARD, OREG. INDIAN CREEK NR IMBLER GORDON CREEK NR ELGIN OR RYSDAM CANYON NR MINAM OR	MINAM RIVER AT MINAM,OREG. DEADMAN CR NR CENTRAL FERRY,WASH MEADDW CREEK NR CENTRAL FERRY, WASH. TUCANNON RIVER NEAR STARBUCK, WASH.	
HYDROLOGIC Unit CODE	17050124 17050124 17050124	17050124 17050124 17050124 17050124 17050124	17050124 17050124 17050124 17050124	17050124 17050201 17050201 17050201	17050201 17050201 17050203 17060101	17060103 17060104 17060104 17060104	17060105 17060107 17060107 17060107	-

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LONGITUDE	1165700 1171910 1171048 1172042	1190122 1141640 1142000 1142330	1144547 1144848 1144954 1144954	1144903 1144311 1144355 1144011	1143348 1143143 1143325 1143249	1142836 1142850 1142815 1142727	1143315 1143318 1142915 1142848	
LATITUDE	465500 465530 464357 465232	461259 443340 442800 442630 443340	435303 435510 440139 440148	441547 441715 441606 441450 441550	441519 441452 441726 441718	441805 441756 441726 441539	435544 435546 435907 440023	
STATION NAME AND LOCATION	PALOUSE R BL POTLATCH PALOUSE RIVER NEAR COLFAX, WASH. S.F. PALOUSE R. AT PULLMAN, WASH S F PALOUSE R NR COLFAX PALOUSE RIVER AT HOOPER, WASH.	SNAKE RIVER AT BURBANK, WASH. CHALLIS C NR CHALLIS ID CHALLIS C NR CHALLIS ID	SALMON RIVER AT HEAD NR OBSIDIAN ID BEAVER CREEK NEAR STANLEY, IDAHO CHAMPION CREEK NEAR OBSIDIAN, IDAHO FOURTH OF JULY CREEK NEAR OBSIDIAN, IDAHO VALLEY CREEK AT STANLEY, IDAHO	BASIN CREEK NEAR STANLEY, IDAHO YANKEE FORK SALMON R NR CLAYTON IDAHO SALMON RIVER BELOW YANKEE FORK, NEAR CLAYTON WARM SPRINGS CREEK AT ROBINSON BAR NR CLAYTO PEACH CREEK NEAR CLAYTON, IDAHO	SLATE CREEK NEAR CLAYTON, IDAHO HOLMAN CREEK NEAR CLAYTON, IDAHO THOMPSON C AB PAT HUGHES C NR CLAYTON, IDAHO PAT HUGHES CREEK NEAR CLAYTON, IDAHO THOMPSON CREEK NEAR CLAYTON IDAHO	SQUAW CREEK ABOVE BRUND CREEK NR CLAYTON, ID BRUND CREEK NEAR CLAYTON, IDAHO SQUAW CREEK BL BRUND CREEK NR CLAYTON ID SQUAW CREEK NEAR CLAYTON, IDAHO SALMON RIVER ABOVE EAST FORK NR CLAYTON, IDA	S.F. OF E.F. SALMON R AB W.F. NR CLAYTON, ID W.F. OF E.F. SALMON R AB S.F. NR CLAYTON, ID WEST PASS CREEK NEAR CLAYTON, IDAHO E.F. SALMON P. BL. BOWERY G. S. NR CLAYTON, ID	
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	CLEARWATER FER WASTEWA SHLANDS DRA UMBIA RIVE	2 1 1 1 1 1 1 1 1 1 1	A A A A A	HE'A VA	ILL ER OW ADE	LES TAUC E S		
		ROCK CREEK NEAR RODSEVELT. N F TOUCHET R AT PVT ROAD TOUCHET R AT U S HIWAY 12 SF TOUCHET R 2 MI S DAYTON TOUCHET R 1 MI BELOW DAYTO	TOUCHET R BD XING 2MI E PRWALLA WALLA R AT MILTON-FRMILL CR BLW BLUE CR NR WALYELLOWHAWK CR NR COLLEGE PTOUCHET RIVER AT BOLLES, W	TOUCHET RIVER AT TOUCHET WALLA WALLA RIVER NEAR TOU WALLA WALLA R BL WARM SPR CORPORATION UMATILLA RIVER AB MEACHAM	UMATILLA R NR UMATILLA ORE BUTTER C AB HOG HOLLOW NR WILLOW CREEK AT HEPPNER, O WILLOW CREEK NR ARLINGTON, CASCADE SALMON HATCHERY OR	RATTLESNAKE C 5.5 M CNTY RD BRDG WF MAJOR CREEK MILE 3.5 TROUT LAKE C IM E OF TROUT LAKE WHITE SALMON R IM EAST TROUT LAKE WHITE SALMON RIN NORTHWESTERN LK	WHITE SALMON R USGS KLICKITAT R BLW SODA BIG MUDDY CREEK NEAR KLICKITAT R BLW SODA	
2190	17060308 17070101 17070101 17070101	17070101 17070102 17070102 17070102	17070102 17070102 17070102 17070102	17070102 17070102 17070103 17070103	17070103 17070103 17070104 17070105	17070105 17070105 17070105 17070105	17070106 17070106 17070106 17070106	
HYDROLOGIC Unit Code	0560 070 070	070 070 070	070	070	270	070 070 070	070 070 070	
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SUSP DISCHARGE		MIIX	ZIZ N D	NDNAZ	ব ব ব ш		ΣO	0222	
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OW END RABY	1974	1967 1967 1967	1967 1967 1967	1975 1975 1974 1974	1973 1974 1974	1972 1978 1978	1978 1978 1978	1990	
OW BEGIN	1973	1949 1962 1965 1965	1965 1962 1961 1961	1958 1974 1957 1973	1973 1974 1974 1951 1951	1971 1973 1973 1979	1973 1972 1973 1966 1971	1976 1978 1978 1979	
BASIN BOT9183230	024	8 88	004 004 004 004	124	024		014	014	
DRAINAGE AREA	, s , s	1297.00 231.00 590.00 1680.00	121.00 2520.00 515.00 7580.00 1548.00	2160.00 205.00 2700.00	526.00 10500.00		240400.00 47.90	5.46 8.32 3.06	
TYPE OF SITE	A.S.	NS N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	MS MS MS	MS M	AS AS AS	N N N C	·
COUNTY		039 023 023 023	059 023 023 055 029	013 013 013 031 031	065 031 065 055 011	051 051 051 051	051 051 051 051	051 051 051	
3TAT2	053	053 041 041 041	041 041 041 030	0000 1140 1140	041 041 041 053	053 041 041 041	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0000 1440 1141	
LONGITURE	1211733	1211232 1184300 1193220 1193730	1184910 1192550 1190825 1202430 1140736	1201500 1204354 1204740 1211332 1212340	1212340 1212340 1210855 1205405 1224145	1224012 1220300 1220300 1220200 1220000	1215400 1215400 1215400 1220135 1220050	1220136 1220205 1220340 1220313	
LATITUDE		454524 442715 442540 443115	450925 444850 445320 453516 482944	440700 440340 440650 444253 445708	445708 445708 445124 453720	453730 453000 453000 453000	453000 453000 453000 453645 452950	452826 452940 452928 452741	
STATION NAME AND LOCATION	ATO MIDDY OP NP OF FNWOOD	KLICKITAT R NR PITT JOHN DAY RIVER AT PRAIRIE CITY, OREG. SO FK JOHN DAY RIVER NR DAYVILLE,OREG. JOHN DAY R AT PICTURE GORGE. NR DAYVILLE,ORE	CAMAS CREEK NEAR UKIAH, OREG. N FK JOHN DAY R AT MONUMENT, OREG. M FK JOHN DAY R AT RITTER, OREG. JOHN DAY R AT MCDONALD FERRY,OREG. N F FLATHEAD RIVER NEAR COLUMBIA FALLS, MT.	CROOKED RIVER AT POST, OREG. BEAR CREEK NEAR PRINEVILLE,OREG. CROOKED R NR PRINEVILLE, OREG. CAMPBELL CREEK NR WARMSPRINGS,OREG. COYOTE CREEK NEAR SIMNASHO,OREG.	BEAVER CR NR SIMNASHO,OREG. QUARTZ CREEK NEAR SIMNASHO,OREG. WARM SPRINGS RIVER NR KAHNEETA HOT SPRINGS,O DESCHUTES RIVER AT MOODY, NEAR BIGGS OREG VANCOUVER WESTSIDE PRIMARY PLANT	VANCOUVER EAST ACT SLDG PLT COUGAR CR AT S-10 < DEER CR AT S-10 < NORTH FORK AT RM .1 ABV S10	COLUMBIA RIVER AT WARRENDALE,OREG. BULL RUN R NR MULTNOMAH FALLS, OREG.	FIR CREEK NEAR BRIGHTWOOD,OREG. NO FK BULL RUN R NEAR MULTNOMAH FALLS,OREG. COUGAR CREEK NEAR BULL RUN,OREG. CAMP CREEK NEAR BULL RUN,OREG.	
HYDROLOGIC Unit Code	17070406	17070106 17070201 17070201	17070202 17070202 17070203 17070204	17070304 17070304 17070306 17070306	17070306 17070306 17070306 17070306 17080001	17080001 17080001 17080001 17080001	17080001 17080001 17080001 17080001	17080001 17080001 17080001	

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ORGANIZATION 3000	USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USSCS USSCS	USGS USGS USGS USGS USGS	USER USBR USBR USBR USBR	USBR USBR USBR USBR USBR	USBR USBR USBR USBR	
SUSP DISCHARGE	2 N	vα	`αα <b>∢ Ζ</b>	Z ~ Z Z				
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OW END Year	1980	1971	1975 1975 1979	1979 1979 1979 1979	1978 1974 1974 1974	1975 1974 1975 1974		
OW BEGIN	1978 1962 1978 1953	1968 1968 1950 1974 1964	1969 1969 1972 1977 1950	1949 1972 1961 1962 1972	1972 1972 1972 1972	1972 1972 1972 1972 1972	1972 1972 1972 1972	
BOTGIRDS30	013	124 124 004 124	014	00 4 00 4 00 4				
DRAINAGE AREA	15.40 241000.00 731.00	3.29 1030.00 1400.00 1461.00 2349.00	317.00	106.00 53.10 174.00				
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COUNTY	005 011 051 015	041 041 041 041	007 007 057 043 047	043 043 043 043 053	005 071 071 053 067	067 067 067 067 067	067 067 067 067	
3TAT2	041 053 041 053	053 053 053 053 053	041 041 041 041	0041	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0000	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
LONGITUDE	1220622 1224030 1224044 1224044 1225630	1221934 1220551 1223654 1225035	1233555 1233725 1165700 1230410 1220600	1220740 1222123 1223035 1222215 1232320	1222700 1230411 1232935 1232655 1231317	1231259 1230711 1230220 1230317 1230034	1225653 1225658 1224753 1224513	
LATITUDE	452638 453730 453721 453211 460812	460717 462813 463038 462619 460844	460615 460655 455455 442848	444510 444506 442335 443055 445450	450600 451326 450835 445815 452643	453558 453823 453800 453008 4531111	452952 452658 452339 452420	
STATION NAME AND LOCATION	SOUTH FORK BULL RUN RIVER NEAR BULL RUN,OREG COLUMBIA RIVER AT VANCOUVER,WASH. WILLAMETTE RM 11.3,DOWNSTREAM OF DREDGE,PORT LEWIS RIVER AT ARIEL, WASH LONGVIEW EAST PRIMARY PLANT	DRY CREEK NEAR COUGAR, WASH. COWLITZ RIVER NR RANDLE, WASH. COWLITZ RIVER BELOW MAYFIELD DAM, WASH. COWLITZ RIVER AT TOLEDO, WASH. COWLITZ RIVER AT KELSO, WASH.	WATERWORKS CREEK NR SVENSEN OREGON SITE NO 3 WATERWORKS CREEK NR SVENSEN OREGON SITE NO 3 PALQUSE RIVER NR POTLATCH ID BUTTE C AB SODOM C NR HALSEY OR NO SANTIAM R BL BOULDER CR NR DETROIT, OREG.	BREITENBUSH R ABV CANYON CR NR DETROIT, OREG LT ND SANTIAM R AB EVANS CR NR GATES,OREG. SOUTH SANTIAM RIVER BELOW CASCADIA, OREG. MIDDLE SANTIAM R NEAR CASCADIA,OREG. RICKREALL C NR DALLAS AT GAGE	YAMHILL R AT DAYTON BOAT RP WILLAMINA C NR WILLIAMINA MILL CR NR WILLIAMINA AT GAGE TUALATIN R AT CHY GR CNT RD BRDG	GALES CR BALM GR CNT RD BRDG W F DAIRY CR N BKS HWY 26 BRDG E F DAIRY CR MTNDALE CNT RD BRDG TUALATIN R CORNELIUS CNT RD BRDG DAIRY CR HILLSBORD HWY 8 BRDG	ROCK CR HILLSBORG CNT RD BRDG TUALATIN R FARMINGTN HARRIS BRDG TUALATIN R TUALATIN HWY 99W BRDG FANNO CR DURHAM CNT RD BRDG	
HYDROLOGIC Unit Code	17080001 47080001 17080001 17080002	17080003 17080004 17080005 17080005	17080006 17080006 170876AF 17090003	17090005 17090005 17090006 17090006	17090007 17090008 17090008 17090008	17090010 17090010 17090010 17090010	17090010 17090010 17090010	

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ONGANIZATION 3003	USBR USGS USFS USGS	uses uses uses uses uses	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USEPA USGS	
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OW FUD YEAR	197	197 197 197 197	1980 1980 1980 1980	1980 1980 1980 1980	1980 1980 1980 1980	1980 1980 1980 1980	197	
OM BEGIN	1972 1962 1967 1975	1978 1978 1978 1978	1978 1978 1978 1978	1978 1978 1978 1978	1978 1978 1978 1978	1978 1978 1978 1978	1959 1978 1971 1965	
BASIN DESCRIPTOR	124						004 004 024	
DRAINAGE Area	706.00					86.30	74.10 445.00 48.00	
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3TAT2	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	00000	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	0 0 0 0 0 1 1 1 1 1 1 1	041 041 053	053 053 053 053	
LONGITUDE	1224030 1224030 1215510 1222356 1222356	1223942 1223935 1223918 1223927 1223938	1224018 1224020 1224020 1224022	1224022 1224047 1224047 1224047 1224055	1224055 1224055 1224100 1224100 1224100	1224105 1224105 1224105 1224115 1243332	1233723 124 1850 1225748 1230755	
LATITUDE	452103 452103 450100 453044 453103	452858 452909 452923 452925 452925	453152 453154 453154 453156 453156	453156 453213 453213 453213 453218	453218 453218 453222 453222	453225 453225 453225 453233 475724	473546 473220 463942 463245	
STATION NAME AND LOCATION	TUALATIN R W LINN HWY 212 BRDG TUALATIN RIVER AT WEST LINN,OREG. BIG BOTTOM KELLY CR ON KANE RD NR GRESHAM WILLAMETTE RIVER AT PORTLAND,OREG.	WILLAMETTE RM 15.3 ,ROSS ISLAND LAGOON,PORTL WILLAMETTE RM 15.1 ,ROSS ISLAND LAGOON,PORTL WILLAMETTE RM 14.8 ,EAST CHANNEL,PORTLAND,OR WILLAMETTE RM 14.7 ,ROSS IS.LAGOON OUTL.PORT WILLAMETTE RM 14.3 ,EAST CHANNEL, PORTLAND,O	WILLAMETTE RM 11.8 ,UPSTREAM OF DREDGE,PORTL WILLAMETTE RM 11.75,UPSTREAM OF DREDGE,PORTL WILLAMETTE RM 11.75,UPSTREAM OF DREDGE,PORTL WILLAMETTE RM 11.7 ,UPSTREAM OF DREDGE,PORTL WILLAMETTE RM 11.7 ,UPSTREAM OF DREDGE,PORTL	WILLAMETTE RM 11.7 ,UPSTREAM OF DREDGE,PORTL WILLAMETTE RM 11.25,DOWNSTREAM OF DREDGE,POR	WILLAMETTE RM 11.1, DOWNSTREAM OF DREDGE, POR WILLAMETTE RM 11.1, DOWNSTREAM OF DREDGE, POR WILLAMETTE RM 11.0, DOWNSTREAM OF DREDGE, POR WILLAMETTE RM 11.0, DOWNSTREAM OF DREDGE, POR WILLAMETTE RM 11.0, DOWNSTREAM OF DREDGE, POR	WILLAMETTE RM 10.9 ,DOWNSTREAM OF DREDGE,POR WILLAMETTE RM 10.9 ,DOWNSTREAM OF DREDGE,POR WILLAMETTE RM 10.9 ,DOWNSTREAM OF DREDGE,POR WILLAMETTE RM 10.7 ,DOWNSTREAM OF DREDGE,POR DICKEY R AB COLBY CR NR LA PUSH, WASH.	N.F. QUINAULT RIVER NEAR AMANDA PARK, WASH. QUEETS RIVER NEAR CLEARWATER, WASH. CHEHALIS SECONDARY PLANT SMITH FORK CHEHALIS R AT ROISTFORT, WASH.	
HYDROLOGIC Unit Code	17090010 17090010 17090011 17090012	17090012 17090012 17090012 17090012	17090012 17090012 17090012 17090012	17090012 17090012 17090012 17090012	17090012 17090012 17090012 17090012	17090012 17090012 17090012 17090012	17100102 17100103 17100103 17100103	

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OW END YEAR	1975	c/61	1975	1973 1974 1974	1974 1974 1975 1974	1967 1974 1974 1967	1967 1967 1974 1974 1974	1973 1 <b>9</b> 71	
OW BEGIN	1960	1975 1958 1961	1960 1966 1963 1965 1977	1973 1960 1972 1972 1972	1972 1972 1971 1972 1962	1964 1972 1972 1971 1957	1957 1957 1972 1972 1972	1966 1968 1967 1967	
BASIN Descriptor	014	014	004 014 004	00 4 4 4 4	004		00 4 4	004 124 004	
DRAINAGE AREA	155.00	1294.00 64.90	299.00 41.30 130.00	667.00	13.40	334.00	.78	588.00 227.00 1344.00 449.00	
40 34YT 3T12	3 A 3	N N N	A A A A A A A A A A A A A A A A A A A	A A A A A A A A A A A A A A A A A A A	M S A S A S A S A S A S A S A S A S A S	NS N N N N N N N N N N N N N N N N N N	A S S S S S S S S S S S S S S S S S S S	AS S AS	
COUNTY	041	027 027 027	027 027 049 049	057 057 041 041	0000 041 041 041	0000 1140 1140	000 041 041 041	039 019 019	
3TAT2	053	053 053 053	053 053 053 053 041	0041 0041 0411	00 04 1 1 4 0 1 4 0 1 4 0	041 041 041 041	041 041 041 041	004 041 041 140	
LONGITIJDE	1225638	1225347 1231845 1232311	1232937 1233620 1234400 1233910 1235530	1234515 1234320 1235643 1235845 1235310	1235420 1240330 1235015 1235101 1235200	1235200 1240410 1240040 1234950 1235120	1235105 1235235 1235742 1240325 1235705	1235255 1224340 1232440 1225650	
LATITUDE	463713	465617 465617 470017	472305 472305 465140 463900 455711	454215 452835 450125 445500	444650 444205 443929 443620	443200 443350 443036 442310 443035	443220 443205 442744 441755 440913	440345 432100 431620 425550	
STATION NAME AND LOCATION	SKOOKUMCHUCK RIVER NEAL	HANAFUKU CK NK BUCUDA, WASH CHEHALIS RIVER AT PORTER, WASH. CLOQUALLUM RIVER AT ELMA, WASH.	SATSOP RIVER NEAR SATSOP, WASH. WYNDOCHEE RIVER NEAR GRISDALE, WASH. NORTH RIVER ABOVE JOE CR, NR RAYMOND, WASH. WILLAPA RIVER NEAR WILLAPA, WASH.	NEHALEM RIVER NEAR FOSS, OREG. WILSON RIVER NEAR TILLAMOOK, OREG. SALMON RIVER NEAR OTIS, OREG. DRIFT CREEK NEAR CUTLER CITY, OREG. SILETZ RIVER AT SILETZ, OREG.	EUCHRE CREEK NEAR SILETZ,OREG. MOLOCK CREEK NEAR BEVERLY BEACH,OREG. YAQUINA RIVER NEAR CHITWOOD,OREG. ELK CREEK NEAR ELK CITY,OREG.	DEER C VI THEIL CREEK NEAR SOUTH BEACH,OREG. BEAVER CREEK NEAR ONA,OREG. ALSEA RIVER NEAR TIDEWATER, OREG. NEEDLE BRANCH NEAR SALADO,OREG.	FLYNN CREEK NEAR SALADO,OREG. DEER CREEK NEAR SALADO,OREG. DRIFT CREEK NEAR WALDPORT,OREG. YACHATS RIVER NEAR YACHATS,OREG.	SIUSLAW R NR MAPLETON, OREG. STEAMBOAT CREEK NEAR GLIDE,OREG. NORTH UMPQUA R. AT WINCHESTER, OREG. SOUTH UMPQUA RIVER AT TILLER, OREG.	
HYDROLOGIC Unit Code	17 100 103	17 100 103 17 100 103 17 100 104	17100104 17100104 17100105 17100106 17100201	17100202 17100203 17100204 17100204	17 100204 17 100204 17 100204 17 100205	17100205 17100205 17100205 17100205	17100205 17100205 17100205 17100205	17100206 17100301 17100301 17100302	

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ORGANIZATION GODE	USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USFS USFS USFS USBR	USGS USSCS USGS USGS USGS	USGS USGS USGS USSCS USSCS	uses usscs usscs usscs
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OM END	96 96	1973 1973 1973 1975	1979 1979 1979 1979	1979 1975 1975 1975	1976 1976 1976	1976 1976 1976	1976
OW BEGIN	1967	1968 1967 1969 1965 1967 1966	1967 1967 1972 1969 1972	1972 1971 1971 1973 1973	1959 1977 1976 1976 1975	1976 1976 1976 1977 1959	1976 1976 1977 1977
BASIN DESCRIPTOR	000 4 4 6		004 124 014 004	124	124	014	
DRAINAGE AREA		210.00 1670.00 3683.00 104.00 116.00 86.10	379.00 246.00 697.00 245.00 133.00	1215.00	3939.00	3093.00	
TYPE OF	A A S	E E E E E E E E E E E E E E E E E E E	A S A S A S A S A S A S A S A S A S A S	AS S A S S A S S A S A S A S A S A S A	M S M S M S M S M S M S M S M S M S M S	MS SW SW SW SW	X X X X
YTNUOD	019	010 010 010 010 010 010	029 029 029 029 029	029 029 029 029	015 057 073 073 073	073 073 073 057	057 057 061
3TAT2	0041	0000000	0000 111111	0000 111111	041 053 053 053 053	053 053 053 053 053	053 053 053
LONGITUDE	123 1040 1232540	1232150 1232150 1232145 1233150 1242900 1242920	1223055 1223020 1224130 1224125	1225030 1224240 1224249 1224256 1232100	1240330 1222025 1215706 1215658 1215639	1215733 1221354 1221354 1213400 1222025	1220954 1214611 1220045 1215705
LATITUDE	424930 425525	430410 430410 432410 433510 424905	424350 424245 423935 423905 423950	423130 420908 420904 421000	423450 482640 485042 485158 485306	485315 484721 484721 482515 483045	483235 483128 481605 480610
STATION NAME AND LOCATION	COW CREEK NEAR AZALEA, DREG. COW CREEK NEAR RIDDLE, DREG.	UCKINGGLASS CREEK AT BROCKWAY, DREG. SOUTH UMPQUA RIVER NEAR BROCKWAY, OREG. CALAPOOYA CREEK NEAR DAKLAND, OREG. UMPQUA RIVER NEAR ELKTON, OREG. SIXES RIVER AT SIXES, OREG. ELK RIVER NEAR SIXES, OREG.	ROGUE RIVER BL PROSPECT, OREG. S FK ROGUE R SOUTH OF PROSPECT, OREG. ROGUE RIVER AT MCLEOD,OREG. BIG BUTTE CREEK NEAR MCLEOD,OREG. ELK CREEK NEAR TRAIL, OREG.	ROGUE R AT DODGE BR NR EAGLE POINT,OREG. LOWER EAST FORK ASHLAND CREEK LOWER WEST FORK ASHLAND CREEK ASHLAND CREEK FILTER PLANT UUMP OFF JOE C NR MERLIN OR	RDGUE RIVER NEAR AGNESS, OREG. SKAGIT R NR MT VERNON WA GALLOP CR NR GLACIER, WASH GALLOP CR ABV MOUTH NR GLACIER WASH GALLOP CR NR MOUTH AT GLACIER, WASH	CORNELL CREEK AT GLACIER WASH VAN ZANDT PORTAL NR VAN ZANDT, WASH STREAM ABV VAN ZANDT MINE NR VAN ZANDT, WASH SAUK R NR SAUK WA SKAGIT RIVER NEAR MOUNT VERNON, WASH.	COKEDALE MINE NR SEDRO WOOLLEY, WASH SKAGIT R NR CONCRFTE WA NF STILLAGUAMISH R NR ARLINGTON SF STILLAGUAMISH R NR GRANITE FALS
HYDROLOGIC Unit CODE	17100302 17100302	17100302 17100303 17100303 17100303 17100306 17100306	17 100307 17 100307 17 100307 17 100307	17100307 17100308 17100308 17100310	17100310 17110002 17110004 17110004	17110004 17110004 17110006 17110006	17110007 17110007 17110008 17110009

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SUSP DISCHARGE	704 H 4	Z×xx			<b>₹0000</b>	9	ω	
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OW END PA3Y	1976			1973	1975 1970	1975	1966	
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STATION NAME AND LOCATION	REDWOOD C AT R V BR NR BLUE LK CALIF LACKS C NR ORICK CALIF REDWOOD C AB PANTHR C NR ORICK CALIF HIGH-SLOPE SCHIST C NR ORICK CALIF COPPER C NR ORICK CALIF	SLIDE C NR DRICK CALIF REDWOOD C AT SPB NR ORICK CALIF BRIDGE C NR DRICK CALIF REDWOOD C AB HRY WR C NR ORICK CALIF HARRY WIER CK NR ORICK CA	TOM MC DONALD C NR ORICK CALIF FORTYFOUR C NR DRICK CALIF MILLER C NR ORICK CALIF MILLER C AT MOUTH NR ORICK CALIF REDWOOD CREEK NEAR ORICK CALIF	BOND C NR DRICK, CA CLOQUFT C NR DRICK, CA OSCAR LARSON C NR ORICK CALIF GANS SOUTH C NR ORICK CALIF ELAM C NR ORICK, CA	GANS WEST C NR DRICK CALIF MC ARTHUR C NR ORICK CALIF LDW-SLOPE SCHIST C NR ORICK CALIF HAYES C NR DRICK CALIF LOST MAN C NR DRICK CALIF	LOST MAN C TR NR ORICK CALIF LARRY DAMM C NR ORICK CALIF LITTLE LOST MAN C AT SITE NO 2 NR ORICK CALI LITTLE LOST MAN C NR ORICK CALIF GENEVA C NR ORICK CALIF	BERRY GLENN C NR DRICK CA REDWODD CREEK AT DRICK CALIF REDWODD C TR AB M75 RD CULVERT 21 NR DRICK C REDWODD C TR AT M75 RD CULVERT 21 NR DRICK C	
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STATION NAME AND LOCATION		REDWOOD C TR BL M75 RD CULVERT 21 NR ORICK C REDWOOD C TR AT M75 RD CULVERT 20 NR ORICK C REDWOOD C TR BL M75 RD CULVERT 20 NR ORICK C EEL R BL SCOTT DAM NR POTTER VALLEY POTTER VALLEY	EEL R NR DOS RIOS CALIF OUTLET CREEK NR LONGVALE, CA. EEL R ABOVE DOS RIOS CALIF FORBES CR NR LAKEPORT CA MF EEL R AB BLACK BUTTE R NR COVELO CALIF	BLACK BUTTE R NR COVELO CALIF MF EEL R BL BLACK BUTTE R NR COVELO CALIF WILLIAMS C NR COVELO CALIF SHORT C NR COVELO CALIF MILL CREEK NEAR COVELO, CALIF.	ELK CREEK NEAR HEARST CALIF MIDDLE FORK EEL R NR DOS RIOS CALIF EEL R BL DOS RIOS CALIF HULLS C NR COVELO CALIF NORTH FORK EEL RIVER NR MINA; CALIF.	CHAMISE CREEK NEAR ISLAND MOUNTAIN, CALIF. EEL R AT FORT SEWARD CALIF DOBBYN CREEK NEAR FORT SEWARD, CALIF. EEL RIVER AT SCOTIA CALIF VAN DUZEN RIVER NR BRIDGEVILLE CALIF	STANDLEY CR STATION 1 STANDLEY CR STATION 2 STANDLEY CR STATION 3 STANDLEY CR STATION 4 STANDLEY CR STATION 5	STANDLEY CR STATION 6 STANDLEY CR STATION 7 GEORGIA PACIFIC STANDLEY CR 6 GEORGIA PACIFIC STANDLEY CR 1	-
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STATION NAME AND LOCATION	GEORGIA PACIFIC STANDLEY CR 2 GEORGIA PACIFIC STANDLEY CR 3 GEORGIA PACIFIC STANDLEY CR 4 GEORGIA PACIFIC STANDLEY CR 5 GEORGIA PACIFIC STANDLEY CR 5	SOUTH FORK EEL RIVER NR BRANSCOMB CALIF ELDER CREEK NEAR BRANSCOMB CALIF SF EEL RIVER NR MIRANDA CALIF BULL CREEK NEAR WEOTT, CALIF. HONEYDEW C AT HONEYDEW CALIF	ASH CREEK DOOLEY CREEK FELIZ CREEK PIETA CREEK POTTER VALLEY POWERHOUSE TAILRCE NR POTTER V	REDWOOD LOG CR STATION 1A REDWOOD LOG CR STATION 1B REDWOOD LOG CR STATION 2 REDWOOD LOG CR STATION 3 REDWOOD LOG CR STATION 3	REDWOOD LOG CR STATION 5 RUSSIAN RIVER NEAR UKIAH, CALIF. EAST FORK RUSSIAN RIVER NEAR CALPELLA CALIF EAST FORK RUSSIAN RIVER NEAR UKIAH CALIF RUSSIAN RIVER NEAR CLOVERDALE, CALIF.	BIG SULPHUR C NR MIDDLETOWN CA BIG SULPHUR CREEK NR CLOVERDALE CALIF MAACAMA CREEK NEAR KELLOGG, CALIF. DRY CREEK NR GEYSERVILLE CALIF RUSSIAN RIVER NR GUERNEVILLE CALIF	SALMON CREEK AT BODEGA CALIF KLAMATH RIVER NR SEIAD VALLEY CALIF SHASTA RIVER NR YREKA CALIF HUNTER CREEK 2	
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LONGITUDE	1240323 1240400 1240310	1240320 1240332 1233200 1235957 1232835 1225631	1223808 1224809 1224946 1225630 1230738	1232620 1234015 1231940 1230810 1232935	1233400 1203300 1202400 1202300 1202700	1202700 1205536 1221838 1221356 1220805	1220843 1221108 1221108 1222652	
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STATION NAME AND LOCATION	HUNTER CREEK 1 HIGH PRAIRIE CREEK MYNOT CREEK HIGH PRAIRIE CR STATION	HIGH PRAIRE CR STATION 2 HIGH PRAIRIE CR STATION 6 KLAMATH RIVER AT ORLEANS CALIF KLAMATH RIVER NEAR KLAMATH CALIF SALMON RIVER AT SOMES BAR CALIF WEAVER C NR DOUGLAS CTY CA	CLEAR CREEK AT FRENCH GULCH, CALIF. TRINITY RIVER AT LEWISTON CALIF GRASS VALLEY CREEK AT FAWN LODGE NR LEWISTON WEAVER C NR DOUGLAS CITY CALIF NORTH FORK TRINITY RIVER AT HELENA CALIF	TRINITY RIVER NEAR BURNT RANCH CALIF TRINITY R AT HOOPA CALIF SOUTH FORK TRINITY RIVER ICE CREAM C AB BIG C NR HAYFORK S F TRINITY RIVER BL HYAMPOM, CALIF.	SF TRINITY R NR SALYER CALIF THOMAS C AB HUNTERS SPG NR LAKEVW BAUERS CREEK NR LAKEVIEW COX CREEK NR LAKEVIEW OR CAMP CREEK NR LAKEVIEW OR	AUGER CREEK NR LAKEVIEW OR PIT RIVER NEAR CANBY CALIF SACRAMENTO RIVER NR MT SHASTA CALIF COW CREEK NEAR MILLVILLE CALIF BATTLE C NR COTTONWOOD CALIF	BATTLE CR BL COLEMAN FISH HATCHERY NR COTTON SACRAMENTO RIVER AB BEND BRIDGE NR RED BLUFF FY77CHANGE OPERATION OWDC 69834 TO SF COTTONWOOD C NR COTTONWOOD CA	
HYDROLOGIC Unit Code	18010209 18010209 18010209	18010209 18010209 18010209 18010210	18010211 18010211 18010211 18010211	18010211 18010211 18010212 18010212	18010212 18020001 18020001 18020001	18020001 18020002 18020005 18020101	18020101 18020101 18020101 18020102	

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DRAINAGE AREA		244.00 88.70 395.00 217.00	371.00 927.00 109.00	8900.00 9020.00 9080.00 109.00	136.00 133.00 194.00	210.00 738.00 38.20	12090.00 38.20 14535.00	3624.00 3676.00	
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<b>LATITUDE</b>		402203 402632 402306 402306 401859	401934 402310 402314 400820 394901	401551 401355 401041 400822 400129	400305 400305 400244 395316 395832	395812 394506 394506 394907 391718	392728 391412 391251 391718	384745 393454 393113 392200	
STATION NAME AND LOCATION	•	MIDDLE FLORK COTTONWOOD CREEK NEAR ONO CALIF NF COTTONWOOD C NR IGO CALIF COTTONWOOD CREEK NR OLINDA CALIF FY77 CHANGE OPERATION OWDC76224 TO SOUTH FORK COTTONWOOD CREEK NR COTTONWOOD CA	SF COTTONWOOD CREEK NR OLINDA CA COTTONWOOD CREEK NR COTTONWOOD CALIF COTTONWOOD C NR COTTONWOOD CA RED BANK C AT RAWSON ROAD BRIDGE NR RED BLUF STONY C BL BLACK BUTTE DAM	SACRAMENTO R AT BEND BRIDGE, NR RED BLUFF, C SACRAMENTO RIVER NR RED BLUFF, CALIF. SACRAMENTO RIVER AT RED BLUFF, CALIF. RED BANK C AT RAWSON RD BR NR RED BLUFF CALIF. ELDER CREEK NEAR PASKENTA CALIF	ELDER CREEK AT GERBER CA FY77 REESTABLISH OWDC 51560 MILL CREEK AT SHERWOOD BRIDGE NR LOS MOLINOS THOMES C AT PASKENTA CALIF THOMES C AT RAWSON ROAD BRIDGE NR RICHFIELD	DEER CREEK AT RED BRIDGE NEAR VINA CA SACRAMENTO RIVER NEAR HAMILTON CITY CALIF FY77 CHANGE OPERATION OWDC51564 TO STONY CREEK BL BLACK BUTTE DAM NR ORLAND CAL STONE CORRAL C NR SITES CA	SACRAMENTO RIVER AT BUTTE CITY CALIF COLUSA WEIR SPILL TO BUTTE BASIN NR COLUSA C SACRAMENTO R AT COLUSA CALIF STONE CORRAL CREEK NR SITES CALIF SACRAMENTO RIVER AT KNIGHTS LANDING, CALIF.	ZAMORA CR NR ZAMORA CA CHEROKEE CANAL NR NELSON CALIF FEATHER R AT OROVILLE CA FEATHER R NR GRIDLEY CA	
HYDROLOGIC UNIT CODE		18020102 18020102 18020102 18020102	18020102 18020102 18020102 18020103	18020103 18020103 18020103 18020103	18020103 18020103 18020103 18020103	18020103 18020103 18020103 18020103	18020104 18020104 18020104 18020104	18020104 18020105 18020106 18020106	

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DRAINAGE AREA	3974.00 3624.00 3676.00 3974.00	23508.00 23508.00 1139.00	964.00	964.00 1044.00 5.02	156.00 156.00 100.00 955.00 11.90	14.20 197.00 100.00 .83 .113.00	37.80 7.42 7.06 739.00	
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LONGITUDE	1213617 1213248 1213846 1215615	1214700 1213016 1213007 1213007 1214822	1214017 1214017 1214136 1213835 1221413	1221414 1220615 1220320 1215630 1212340	1223151 1223151 1222042 1221614 1225511	1225403 1223404 1222042 1224117 1223059	1222426 1221744 1221731 1205536	
LATITUDE	390820 393113 392200 390820	383125 383512 382720 382720 384331	381507 381508 381627 384040 385325	385326 384344 384520 384340 383609	394038 394038 385642 385447	385654 390109 385642 384425 384644	384618 384217 384242 400442	
STATION NAME AND LOCATION	FEATHER R AT YUBA CITY CA FEATHER R NR OROVILLE CA FEATHER RIVER NEAR GRIDLEY CALIF FEATHER RIVER AT YUBA CITY CALIF ORY CREEK NEAR WINTERS CALIF	U C OUTFALL DRAIN NR DAVIS CALIF SACRAMENTO RIVER AT SACRAMENTO CALIF SACRAMENTO RIVER AT FREEPORT CALIF SACRAMENTO RIVER AT FREEPORT CALIF CACHE CREEK AT YOLO, CALIF.	YOLO BYPASS AT LIBERTY ISLAND CA EAST YOLO BYPASS AT LIBERTY ISLAND CA COMBINED YOLO BYPASS AT LIBERTY ISLAND CA WEST YOLO BYPASS NR WOODLAND CA CACHE CREEK AT RUMSEY CA	CACHE CREEK AT RUMSEY CALIF CACHE CREEK NEAR CAPAY, CALIF GOODNOW SLOUGH NR CAPAY CA UNNAMED TRIB IN HUNGRY HOL NR CAP STRONG RANCH SLOUGH AT SACRAMENTO CALIF	GRINDSTONE C NR ELK CREEK CA GRINDSTONE CREEK NR ELK CREEK CALIF BEAR C NR RUMSEY CA CACHE C AB RUMSEY CA HIGHLAND CREEK ABOVE HIGHLAND CREEK DAM, CAL	HIGHLAND CREEK BELOW HIGHLAND CREEK DAM NORTH FORK CACHE CREEK NEAR LOWER LAKE, CALI BEAR CREEK NEAR RUMSEY CALIF DRY C AB APPLETREE C NR MIDDLETOWN CA PUTAH CREEK NR GUENOC CALIF	HUNTING CREEK NR KNDXVILLE CALIF ADAMS CREEK NR KNDXVILLE CALIF NEVADA CREEK NEAR KNOXVILLE, CALIF. INDIAN CREEK NR CRESCENT MILLS CALIF	
HYDROLOGIC Unit Code	18020106 18020106 18020106 18020106	18020109 18020109 18020109 18020109	18020109 18020109 18020109 18020109	18020110 18020110 18020110 18020110	18020115 18020115 18020116 18020116	18020116 18020116 18020116 18020117	18020117 18020117 18020117 18020122	

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DRAINAGE AREA		81.10 81.10 84.00 586.00	597.00 813.00 819.00 1062.00	162.00 250.00 351.00 308.00	84.60 140.00 614.00 673.00	. 23	1009.00	1.58	
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LONGITUDE		1202637 12021117 1202832 1202626	1202942 1204400 1204615 1211610 1205026	1210450 1203652 1205613 1210526	1211603 1210621 1210051 1205645 1182305	1182330 1182345 1183125 1183105	1182918 1183045 1182920 1182624 1182512	1181618 1181308 1181310	
LATITUBE	· ·	395336 394907 395336 395302 394313	394807 395158 395200 394230 391844	392335 393408 393130 393129	391328 390100 385505 384907 355405	355415 355415 361600 361415	361305 361250 361135 363524 354534	362655 360400 360400 355720	
STATION NAME AND LOCATION		L LASI CHANCE C BL FRENCHMAN DAM NK CHILCOUT MF FEATHER R NR PORTOLA CA L LASI CHANCE CREEK BL FRENCHMAN DAM NR CHIL BIG GRIZZLY C AT GRIZZLY VY DAM NR PORTOLA C MF FEATHER R NR PORTOLA CALIF	MF FEATHER R AT DELLEKER CALIF MF FEATHER R BL LONG VALLEY C AT SLOAT CAL MF FEATHER R BL SLOAT CALIF MF FEATHER R NR MERRIMAC CALIF NF DEER C NR WHITE CLOUD	MID YUBA R AB OREGON CR NR NORTH SAN JUAN, C N YUBA R AB HAYPRESS C NR SIERR CY NORTH YUBA RIVER BELOW GODDYEARS BAR, CALIF. NORTH YUBA RIVER ABOVE SLATE CREEK NEAR STRA SOUTH YUBA RIVER AT JONES BAR NR GRASS VALLE	DEER CREEK NEAR SMARTVILLE, CALIF. BEAR R NR AUBURN CALIF MIDDLE FORK AMERICAN RIVER NEAR AUBURN CALIF SF AMERICAN R NR LOTUS CALIF SALMON C TR B CA	SALMON C TR C CA SALMON C TR E CA SODA SPRINGS NR MOUTH ALPINE C NR MOUTH MOUNTINEER C NR MOUTH	L KERN NR GREY MEADOW CLICKS C NR MOUTH FISH C NR MOUTH FY77 CHANGE OPERATION OWDC73807 TO KERN RIVER AT KERNVILLE CALIF	CRUNIGEN CREEK BL MINERAL KING HWY NR HAMMON JACKASS C NR MOUTH FISH C NR TROY MEADOW FISH C NP MOUTH	
HYDROLOGIC Unit Code		18020123 18020123 18020123 18020123	18020123 18020123 18020123 18020123	18020125 18020125 18020125 18020125	18020125 18020126 18020128 18020129 18030001	18030001 18030001 18030001 18030001	18030001 18030001 18030001 18030001	18030001 18030002 18030002 19030002	

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LATITUDE	355900 355900 355900 35530 350515	362704 362539 362559 3625640	362700 362624 362644 362701	362709 362539 362559 362644 362705	362708 362704 362709 362710 362644	362701 362709 362709 362705	362757 362714 362636 362705	
STATION NAME AND LOCATION	SHERMAN PASS SKI 2 UNNAMED CREEK SHERMAN PASS SKI 1 UNNAMED CREEK TROUT C NR MOUTH ANTELOPE CR NR TEHACHAPI CA EF KAWEAH R NR THREE RIVERS CA	MOSQUITO C NR MOUTH FRANKLIN C NR MOUTH WHITE CHIEF C NR MOUTH SPRING C NR MOUTH MONARCH C NR MOUTH	MOSQUITO C NR MOUTH EF KAWEAH R BL EAGLE C NR HAMMOND EF KAWEAH R BL EAGLE C NR HAMMOND EF KAWEAH R AB MONARCH C NR HAMMND EF KAWEAH R AB MONARCH C NR HAMMND	MONARCH C NR HAMMOND CA FY77 CHANGE OPERATION OWDC73812 TO FY77 CHANGE OPERATION OWDC73813 TO FY77 CHANGE OPERATION OWDC73814 TO FY77 CHANGE OPERATION OWDC73811 TO	FY77 CHANGE OPERATION OWDC73810 TO FY77 CHANGE OPERATION OWDC73816 TO FY77 CHANGE OPERATION OWDC73809 TO FY77 CHANGE OPERATION OWDC73815 TO EY77 CHANGE OPERATION OWDC73815 TO	EF KAWEAH R AB MONARCH CREEK NR HAMMOND CALI MONARCH C NR HAMMOND CA EF KAWEAH R BL MONARCH C NR HAMMOND CALIF EF KAWEAH RIVER BL MOSQUITO C NR HAMMOND CAL EF KAWEAH R AT SEO NATL P BNDRY NR HAMMOND C	ATWELL CREEK AB MINERAL KING HWY NR HAMMOND REDWOOD CREEK AB MINERAL KING HWY NR HAMMOND SQUIRREL CREEK BL MINERAL KING HWY NR HAMMON EAST FORK KAWEAH RIVER NEAR THREE RIVERS CAL	
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LATITUDE	363730 363945 365500 365500 376500	7 9 9 9 9	364454 364659 360323 362451 364950	350042 360835 364435 365953 363708	370100 363708 370340 370120	374749 375224 374700 380100 373118	372215 380931 382129 374354	
STATION NAME AND LOCATION	ANTELOPE CREEK NR WODDLAKE CA WOOTEN CR NR ORANGE COVE CA BIG CREEK AT BRIDGE DITRIB TO GREEK AT BRIDGE	RUSH CREEK BELOW PETERSON KINGS RIVER BL NF NR TRIMM ROARING R AT RANGER STA NR SUGARLOAF C TR AT MOUTH NR FERGUSON C AT MOUTH NR CED	ROARING R AB SUGARLOAF C NR CEDAR ROARING R AT ROARING R FALLS NR CE TULE R BL SUCCESS DAM CA KAWEAH R BL TERMINUS DAM CA KINGS R BELOW PINE FLAT DAM	CUYAMA R NR SANTA MARIA CALIF PERAZIER CR NR STRATHMORE CA WATOKE CR NR ORANGE COVE CA FRIANT-KERN CANAL AT FRIANT CALIF PANOCHE C BL SILVER C NR PANOCHE CA	LOS BANDS C NR LOS BANDS CALIF PANOCHE C BL SILVER C NR PANOCHE C DRY CREEK NR MADERA CA SCHMIT CREEK NR MADERA CA SAM JOAQUIN RIVER NEAR VERNALIS CALIF	DELTA-MENDOTA CANAL BL TRACY PUMP PLT NR TRA MARSH CREEK NEAR BYRON, CALIF. DELTA MENDOTA CA AT HEAD CA POTTER C TRIB NR PETERS CA MERCED RIVER BELOW MERCED FALLS DAM NEAR SNE	MERCED RIVER NEAR STEVINSON, CALIF. MOKELUMNE RIVER AT WOODBRIDGE CALIF COSUMNES RIVER AT MCCONNELL CALIF MERCED R AT HAPPY ISLES BRIDGE MR YOSEMITE C	
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STATION NAME AND LOCATION	. · ²	MERCED RIVER AT EL CAPITAN BRIDGE NR YOSEMIT 33 MERCED R AT BIG DAK FLAT NR EL PORTAL CAA 31 MERCED RIVER AT RANCHERIA FLAT NR EL PORTAL 33 SOUTH FORK MERCED RIVER NEAR EL PORTAL, CALI 33 MERCED RIVER NEAR EL PORTAL, CALI 33	MOKELUMNE RIVER BL CAMANCHE DAM CALIF SOUTH FORK CALAVERAS RIVER NEAR SAN ANDREAS, 38 NORTH FORK CALAVERAS RIVER NEAR SAN ANDREAS, 38 SOPIAGO C NR DMD RANCH CALIF COSUMNES R NR PLYMOUTH CALIF	COSUMNES RIVER AT MICHIGAN BAR CALIF  SUSUN BAY CARQUINEZ ST MARTINEZ  SUISUN SLOUGH	CARQUINEZ STRAIT SUISUN BAY SUISUN BAY NR ROE ISL HONKER BAY HONKER BAY NR CHIPPS ISL	CARQUINEZ STRAIT CARQUINEZ STRAIT SUISUN BAY NR PT EDITH SUISUN BAY NR PRESTON PT SUISUN BAY NR ROE ISL	HONKER BAY NEW YORK SLOUGH NEW YORK SLOUGH SEW YORK SLOUGH NEW YORK SLOUGH 38	NEW YORK SLOUGH NEW YORK SLOUGH SUISUN BAY SUISUN BAY 36	
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STATION NAME AND LOCATION		SUISUN BAY NEW YORK SLOUGH NEW YORK SLOUGH CARQUINEZ ST CARQUINEZ ST	CARQUINEZ ST CARQUINEZ STRAIT CARQUINEZ STRAIT CARQUINEZ STRAIT	CARQUINEZ STRAIT CARQUINEZ ST CARQUINEZ ST CARQUINEZ ST CARQUINEZ ST	SUISUN BAY SUISUN BAY CARQUINEZ STR AT ECKLEY SUISUN BAY AT PORT CHICAGO ARROYO DEL HAMBRE AT MARTINEZ, CALIF.	WALNUT CREEK AT CONCORD, CALIF. SAN FRANCISCO BAY AT PITTSBURG CALIF SAN FRANCISCO BAY AT BENICIA CALIF SAN FRANCISCO BAY AT ROE ISLAND CALIF R-2 BUDY	BERKELEY PIER PT BLUNT QUARRY PT PT SIMPTON SOUTH HAMPTON SHOUL	CENTRAL SF BAY CENTRAL SF BAY-NR ALCATRAZ SF BAY NR GOLDEN GATE BR SF BAY NR ANGEL ISL	
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STATION NAME AND LOCATION	RACOON STRAIT N SAN FRANCISCO BAY NR RICHMOND SF BAY NR TIBURON SF BAY NR RICHMOND SF BAY NR CORTE MADERA C	SF BAY NR PT SAN PABLO SAN PABLO BAY SAN PABLO NR PT SAN PEDRO SAN PABLO BAY SAN PABLO BAY	SAN PABLO BAY SAN PABLO BAY SAN PABLO BAY SAN PABLO BAY SAN PABLO BAY	SAN PABLO BAY SF BAY NR PT SAN PABLO SF BAY NR PT SAN PABLO SAN PABLO BAY SAN PABLO BAY	SF BAY NR PT SAN PABLO SAN FRANCISCO BAY RICHMOND HARBOR SAN FRANCISCO BAY SAN PABLO BAY	SCHELL SLOUGH NR SP BAY SAN PABLO BAY SAN PABLO BAY SAN PABLO BAY SAN PABLO BAY	SAN PABLO BAY SAN PABLO BAY NAPA R NR NAPA CALIF WILDCAT C AT VALE ROAD AT RICHMOND CALIF	
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LATITUDE		382952 382206 381904 381924 375904	375822 375928 375856 375856	374906 375254 375812 380306 372845	372732 372745 372754 372738 373033	373029 372518 371548 371516 371603	37 1609 37 1603 37 1600 37 1554 37 1554	37 1600 37 1709 37 1738 37 1738	
STATION NAME AND LOCATION		NAPA KIVEK NEAK SI. HELENA CALIF NAPA RIVER NEAR NAPA CALIF REDWOOD CREEK NEAR NAPA, CALIFORNIA SONOMA C AT AGUA CALIENTE CALIF SAN RAFAFL C AT SIRARD LANE AT SAN	SAN RAFAEL CREEK AT SAN RAFAEL, CALIFIRWIN C TR AT SAN RAFAEL CALIFIRWIN C TR NO 2 AT SAN RAFAEL CALIFIRWIN CREEK AT SAN RAFAEL CALIFICORTE MADERA CREEK AT ROSS, CALIF.	SAN FRANCISCO BAY AT GOLDEN GATE BRIDGE CALI SAN FRANCISCO BAY AT TIBURON CALIF SAN FRANCISCO BAY AT POINT SAN PABLO CALIF SAN FRANCISCO BAY AT HERCULES CALIF SF BAY NR COYOTE C	SF BAY NR COYOTE C COYOTE C COYOTE C COYOTE C NEWARK SLOUGH	NEWARK SLOUGH MATADERO C AT PALO ALTO CALIF ROSS C BL JARVIS ROAD NEAR SAN JOSE, CALIF. SARATOGA CREEK AT SARATDGA, CA. CALABAZAS C AT MT EDEN RD NR SARATOGA CA	CALABAZAS C TRIB AT MT EDEN ROAD NR SARATOGA CALABAZAS C AT MTERD NR SARTOGA CALIF CALABAZAS C TR 2 AT MT EDEN RD NR S CALABAZAS C TR4 AT MTERD NR SARATOGA CALIF CALABAZAS C TR5 AT PRC RD NR SARATOGA CALIF	CALABAZAS C AT VREGNA NR SARATOGA CALIF PROSPECT C AT SARATOGA GOLF COURSE NR SARATO PROSPECT C AT MRA LA NR SARATOGA CALIF PROSPECT C TO MP SAPATOGA CALIF	
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STATION NAME AND LOCATION		CALABAZAS C AT RNBO DRI NR CUPERTINO CALIF COYOTE CREEK NR GILROY CALIF SAN FRANCISCO BAY AT CALAVERAS POINT CALIF S SAN FRANCISCO BAY SF BAY NR ISLAIS C	SF BAY NR TREASURE S F BAY NR OYSTER PT SO SF BAY NR CANDLESTICK PT CENTRAL SOUTH SF BAY SO SF BAY NR SAN LEANDRO CHANNEL	COYOTE PT SF BAY NR SAN MATEO BR SF BAY NR BERKELEY PIER SO SAN FRANCISCO BAY COYOTE HILLS	CENT SO SAN FRANCISCO BAY SAN FRANCISCO BAY NR DUMBARTON BR BELMONT SLOUGH BELMONT SLOUGH SF BAY NR SAN MATEO BR	SF BAY NR SAN MATEO BR SF BAY NR SAN MATEO BR	SF BAY NR SAN MATEO BR FOSTER CITY LAGOON FOSTER CITY LAGOON FOSTER CITY MARINA FOSTER CITY LAGOON	FOSTER CITY LAGOON SF BAY CENTRAL SO BAY SF BAY CENTRAL SO BAY SF BAY CENTRAL SO BAY	
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LATITUDE	373346 373346 373346 373937	373951 373950 373950 373949 374720	373914 373846 372658 374126	373724 373514 374048 374659 373106	373318 373706 374200 374800	372824 372822 375509 375547 375507	38 1235 37 1539 37 1401 3648 15
STATION NAME AND LOCATION	SF BAY CENTRAL SO BAY SF BAY CENTRAL SO BAY SF BAY CENTRAL SO BAY OVSTER PT SF BAY NR OYSTER PT	OVSTER PT OVSTER PT OVSTER PT OVSTER PT OVSTER PT OVSTER PT OMETHARBOR	COLMA CREEK AT SOUTH SAN FRANCISCO CALIF SPRUCE BRANCH AT SOUTH SAN FRANCISCO CALIF REDWOOD CREEK AT REDWOOD CITY, CALIF. ARROYO MOCHO NEAR PLEASANTON, CALIF. ARROYO VALLE BL LANG CN NR LIVERMORE CALIF	ARROYO VALLE NEAR LIVERMORE CALIF ALAMEDA CREEK NR NILES CALIF CASTRO VALLEY CREEK AT HAYWARD, CALIF. PERALTA C AT D&KLAND, CALIF. SAN FRANCISCO BAY AT RAVENSWOOD POINT CALIF	SAN FRANCISCO BAY AT REDWOOD POINT CALIF SAN FRANCISCO BAY AT COYOTE POINT CALIF SAN FRANCISCO BAY AT CANDLESTICK POINT CALIF SAN FRANCISCO BAY AT BAY BRIDGE CALIF PACIFIC OCEAN NR HALF MOON BAY	PACIFIC DCEAN NR HALF MODN BAY PACIFIC OCEAN NR HALF MOON BAY MORSES C AT BOLINAS CALIF AUDUBON C NR BOLINAS CALIF PINE CR AT BOLINAS CALIF	WALKER CREEK NEAR TOMALES, CALIFORNIA PESCADERO CREEK NEAR PESCADERO CALIF BUTANO CREEK NEAR PESCADERO, CALIF. MONTEREY BAY
HYBROLOGIC Unit Code	18050004 18050004 18050004 18050004	18050004 18050004 18050004 18050004	18050004 18050004 18050004 18050004	18050004 18050004 18050004 18050004	18050004 18050004 18050004 18050004	18050005 18050005 18050005 18050005	18050005 18050006 18050006 18060001

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STATION NAME AND LOCATION		FY77 DISCONTINUE DWDC P1134 PAC OC NR SAN ELIJO LAGDON	PAC OC NR SAN ELIJO LAGOON PACIFIC OCEAN PACIFIC OCEAN PAC OC NR SAN ELIJO LAGOON MISSION BAY	MISSION BAY MISSION BAY SAN ANTONIO CREEK AT CASITAS SPRINGS CALIF SAN ANTONIO C AT CASITAS SPRINGS VENTURA RIVER NR VENTURA CALIF	ELIZABETH LAKE CN C AB CASTAIC CAL FISH C AB CASTAIC C NR CASTAIC CA CASTAIC C AB GORDON RANCH HOUSE NR CASTAIC C SANTA CLARA R AT LOS ANGELES-VENTURA CO LINE PIRU C BL BUCK CREEK CA	CANADA DE LOS ALAMOS BL APPLE CANYON CA PIRU CR AB FRENCHMANS FLAT CA PIRU CREEK ABOVE LAKE PIRU CALIF HOPPER CREEK NR PIRU CALIF HOPPER C NR PIRU CA	SESPE CREEK NR WHEELER SPRINGS CALIF SESPE CREEK NR FILLMORE CALIF SANTA CLARA R AT SATICOY CALIF SANTA CLARA RIVER AT MONTALVO CALIF ARROYO SIMI NR SIMI CALIF	CALLEGUAS CREEK AT CAMARILLO CALIF KING HARBOR KING HARBOR	
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{ ATITUDE	334456 334019 334020	332503 332930 332930 333136 332954	331413 330639 331248 324532	324929 325713 325707 325702 325825	325707 325623 325658 325024 323306	402503 370315 345520 350500	341825 323957 325927 335648	
STATION NAME AND LOCATION	SANTA ANA R AT SANTA ANA CALIF SANTA ANA R ADMS NR COSTA MESA CA SAN DIEGO CREEK AT JEFFERY RD NR IRVINE CA EL MODINA-IRVINE CH A MYFORD RD NR TUSTIN	PACIFIC OCEAN SAN JUAN CREEK NEAR SAN JUAN CAPISTRANG, CAL SAN JUAN CREEK AT SAN JUAN CAPISTRANG, CAL SAN JUAN CREEK AT SAN JUAN CAPISTRANG CA ARROYO TRABUCO NR SAN JUAN CAPISTRANG CA	SANTA MARGARITA R AT YSIDORA PAC OC NR SAN ELIJO LAGOON SAN LUIS REY RIVER AT OCEANSIDE CALIF MISSION BAY SAN DIEGO RIVER NR SANTEE CALIF	FY76 CHANGE OPERATION OWDC66782 TO POWAY CREEK NEAR POWAY CALIF RATTLESNAKE CREEK AT POWAY CALIF POWAY CREEK TRIBUTARY AT OAK KNOLL ROAD NEAR POMERADO CREEK AT GLENOAK ROAD NEAR POWAY CA	POMERADO CREEK AT POWAY ROAD NR POWAY CALIF BEELER CREEK AT POMERADO ROAD NEAR POWAY CAL LOS PENASQUITOS CR BL POWAY CREEK NR POWAY C SAN DIEGO R AT OLD MISSION DAM TIJUANA RIVER NR NESTOR CALIF	SUSAN R AT SUSANVILLE CALIF OWENS R BL TINEMAHA RE NR BIG PINE CA. W. F. MOHAVE R AB CEDAR SPRINGS CA BLACKBURN CR NR TEHACHAPI CA EF OF WF MOJAVE R AB CEDAR SPRINGS CA.	W. F. MOJAVE R BL CEDAR SPRINGS CA NEW R AT INTERNAT BDY CALEXICO CA NEW R AT DROP 4 AT BRAWLEY CA WHITEWATER RIVER AT WHITEWATER CA	
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HYDROLOGIC Unit Code		190084 C 190084 C 19008400 19008400	19008400 19008400 19008400 19008400	19008400 19008400 19008400 19008400	19008400 19008400 19008400 19008400	19008400 19008400 19008400 19008400	19008400 19008400 19008400 19008400	19008400 19008400 19008400 19008400

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LATITUDE			701654 701604	682225 690524 682126 682710 701522	700956 711535 711630 711740 702920	704013 703104 665137 670513 670530	665827 673418 643351 643815 644252	651317 651317 635427 641833	
STATION NAME AND LOCATION		COLVILLE R AT UMBAT COPPER R NR GALBRAITH LAKE COPPER R NR CORDOVA NOATAK NR NOATAK AK	YUKON R NR STEVENS VILLAGE AK NUSHAGAK R NR NUNACHUAK AK WASILLA C NR WASILLA AK KUPARUK R NR DEADHORSE AK	ATIGUN R TR NR PUMP STATION 4 AK SAGAVANIRKTOK R NR SAGWON AK ATIGUN R 7MI AB GALBRAITH LK NR SAGWON GALBRAITH LK AT OUTLET NR SAGWON AK SAGAVANIRKTOK R W CH AT BRIDGE NR DEADHORSE	COLVILLE RIVER NEAR NUIGSUT AK NUNAVAK C NR BARROW AK ESATKUAT C NR BARROW AK ESATKUAT LAGOON OUTLET AT BARROW AK MEADE RIVER AT ATKASUK AK	MIGUAKIAK RIVER NEAR TESHEKPUK LAKE NR LONEL USUKTUK R NR ATKASUK AK JUNE C NR KOTZEBUE AK KOBUK R AT AMBLER AK KOBUK R AT AMBLER AK	KOBUK R NR KIANA AK NDATAK R AT NDATAK AK SNAKE R NR NOME AK ARCTIC C NR NOME AK WASHINGTON C NR NOME AK	KUZITRIN R NR NOME AK KUZITRIN R NR NOME AK TAYLOR C NR CHICKEN AK FORTYMILE R NR STEEL CREEK AK	
HYDROLOGIC Unit Code		19008400 19008400 19008400 19008400	19008400 19008400 19008400 19010001	19010001 19010001 19010001 19010001	19010002 19010003 19010003 19010003	19010003 19010003 19020001 19020001	19020001 19020001 19020002 19020002	19020002 19020002 19030001	

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LATITUDE	644722 644722 665926 670549	653405 653955 653025 654022 654041	644734 644428 630023 630938	631900 631019 632318 634140 634123	640322 640920 641724 642822 644754	645355 644747 645310 645045 642606	643355 631932 632728 635043	
STATION NAME AND LOCATION	YUKON R AT EAGLE AK YUKON R AT EAGLE AK PORCUPINE R NR FORT YUKON AK EF CHANDALAR R NR VENETIE CHANDALAR R NR VENETIE AK	BOULDER C NR CENTRAL AK HESS C NR LIVENGOOD AK YUKON R AT RAMPART AK HESS C AB FISH C NR LIVENGOOD AK FISH C NR LIVENGOOD AK	NOWITNA R NR RUBY AK MELOZITNA R NR RUBY AK YUKON R AT RUBY AK CHISANA R AT NORTHWAY UCT AK BITTERS C NR NORTHWAY UNCTION AK	TANANA R NR TOK JUNCTION AK CLEARWATER C NR TOK AK I TANANA R NR TANACROSS AK I TANANA R TR NR DOT LK AK BERRY C NR DOT LK AK	CLEARWATER C NR DELTA JCT AK TANANA R AT BIG DELTA AK BANNER C AT RICHARDSON AK SALCHA R NR SALCHAKET AK TANANA R AT FAIRBANKS AK	CHENA R NR TWO RIVERS AK CHENA R NR N POLE AK IL CHENA R NR FAIRBANKS AK CHENA R AT FAIRBANKS AK WOOD R NR FAIRBANKS AK	TANANA R AT NENANA AK 1 SEATTLE C NR CANTWELL AK 1 NENANA R NR WINDY AK 1 NENANA R NR HEALY AK	
HYDROLOGIC Unit Code	19030002 19030002 19030002 19030002	19030002 19030002 19030002 19030002	19030003 19030003 19030004 19030004	19030004 19030004 19030004 19030004	19030004 19030004 19030004 19030004	19030004 19030004 19030004 19030004	19030004 19030004 19030004 19030004	

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OW END RABY	1967 1972 1971 1972	1973 1975 1975	1977 1976	1976 1976 1977 1977	1970 1979 1976 1977	1974 1973 1975	1972 1972 1975 1972
OW BEGIN	1965 1967 1970 1970 1971	1974 1974 1975 1975	1975 1976 1975 1975	1976 1976 1976 1976	1970 1970 1970 1965	1955 1954 1950 1951 1951	1951 1964 1968 1956
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DRAINAGE AREA	2450.00 490.00 12.60 7.81	9. 19 1. 19	61.70		1200.00 49.20 465.00 18700.00	321000.00 11700.00 31100.00	16. 10 6500.00
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LONGITUBE	1491640 1492951 1481513 1485612	1473305 1454354 1454509 1485037 1484406	1484037 1483820 1485817 1463207	1464125 1464024 1463900 1463900	1491100 1500430 1500621 1505223 1541530	1541530 1625250 1553511 1580603 1563705	1532510 1564008 1555357 1555357
LATITUDE	641305 635514 652752 652302 650332	650900 631945 632527 635110 635245	635247 635308 635426 642816 642844	642857 642905 642910 642910 642910	645312 672618 672438 664710 660251	660250 615604 625710 615216 603514	574129 584108 591944 591944
STATION NAME AND LOCATION	NENANA R NR REX AK TEKLANIKA R NR LIGNITE AK BRIDGE C NR LIVENGOOD AK BROOKS C TR NR LIVENGOOD AK POKER C NR CHATANIKA AK	CARIBOU C NR CHATANIKA AK PHELAN C AT MOUTH NR BLACK RAPIDS AK TRIMS C NR BLACK RAPIDS AK HEALY C AT SUNTRANA AK CRIPPLE C NR SUNTRANA AK	COAL C NR SUNTRANA AK HEALY C NR USIBELLI AK LIGNITE C NR HEALY AK REDMOND C NR SALCHAKET AK SALCHA R 7 MI ABOVE GAGE NR SALCHAKET AK	SALCHA R 5 MI ABOVE GAGE NR SALCHAKET AK SALCHA R 6.5 MI ABOVE GAGE NR SALCHAKET AK SALCHA R 8MI AB GAGE NR SALCHAKET AK SALCHA R SITE 2 8MI AB GAGE NR SALCHAKET AK SALCHA R SITE 3 8MI AB GAGE NR SALCHAKET AK	TANANA R AT MINTO AK MF KOYUKUK R NR WISEMAN AK WISEMAN C AT WISEMAN AK JIM R NR BETTLES AK	KOYUKUK R AT HUGHES AK YUKON RIVER AT PILOT STATION AK KUSKOKWIM R AT MCGRATH AK KUSKOKWIM RIVER AT CROOKED CREEK AK POWER C NR CORDOVA AK	UGANIK R NR KODIAK AK ESKIMO C AT KING SALMON AK KVICHAK R AT IGIUGIG AK KVICHAK R AT IGIUGIG AK
HYDROLOGIC Unit Code	19030004 19030004 19030004 19030004	19030004 19030004 19030004 19030004	19030004 19030004 19030004 19030004	19030004 19030004 19030004 19030004	19030004 19030005 19030005 19030005	19030005 19030006 19040001 19040001	19040002 19040002 19040002 19040002

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BASIN Descriptor	4 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	00000	00000 44444	000 004 004	00 00 00 00 00 00 00 00 00	80 80 80 80 80 80 80 80 80 80 80 80 80 8	00 00 4 4 4	
DRAINAGE AREA	1490.00 1110.00 4.46		20.70 10.80 42.00 54.00	137.00 224.00 220.00 131.00 738.00	181.00 634.00 2010.00 51.00	149.00 162.00 62.00 5.70	25.20 30.40 69.70 20.00	
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3TAT2	0002		002 002 002 003	002 002 002 002	002 002 002 002	002 002 002 002	002 002 002 002	
LONGITUDE	1581105 1583537 15840621	85314 31010 32510 35852 22409	15 13842 15 12436 1504609 1505 102 15 14000	1514511 1515005 1514050 1513948 1511535	1492219 1494828 1494828 1510446	1493813 1493840 1485902 1490944 1494840	1494312 1494615 1495520 1495007	
LATITUDE	595604 591630 591630	908 741 741 717 736	592850 592559 594357 594524	594450 594621 600150 600256 601905	602601 602934 602934 602839 603350	605340 605515 605044 605629 610437	610852 610957 610817 611159	
STATION NAME AND LOCATION	NUYAKUK R NR DILLINGHAM AK WOOD R NR ALEKNAGIK AK SILVER SALMON C NR ALEKNAGIK AK	<del></del>	BARBARA C TUTKA LAG KACHEMAK BRADLEY R DIAMOND C	ANCHOR R NR ANCHOR POINT AK ANCHOR R AT ANCHOR POINT AK DEEP C NR NINILCHIK AK NINILCHIK R AT NINILCHIK AK KASILOF R NR KASILOF AK	TRAIL R NR LAWING AK KENAI R AT COOPER LANDING AK KENAI R AT COOPER LANDING AK KENAI RIVER AT SOLDOTNA BEAVER C NR KENAI AK	RESURRECTION C NR HOPE AK RESURRECTION C AT HOPE AK TWENTY MILE R NR PORTAGE AK GLACIER C AT GIRDWOOD AK LITTLE RABBIT C BL OLD SEWARD HWY NR ANCHORA	SF CAMPBELL C AT CANYON MTH NR ANCHORAGE AK SF CAMPBELL C NR ANCHORAGE AK CAMPBELL CREEK NEAR SPENARD AK CHESTER CREEK AT ANCHORAGE AK	
HYDROLOGIC Unit Code	19040002 19040002 19040002	19040002 19050001 19050001 19050001 19050001	19050002 19050002 19050002 19050002	19050002 19050002 19050002 19050002	19050002 19050002 19050002 19050002	19050002 19050002 19050002 19050002	19050002 19050002 19050002 19050002	

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OW END YEAR		1973 1974 1968	1975 1976 1971 1972 1973	1975	1977 1973 1975	1972 1978 1978 1975	1978 1978 1978 1978	1979 1977 1977
OW BEGIN	} on	1948 1967 1948 1965	1948 1948 1948 1948	1957 1958 1962 1949 1958	1954 1971 1970 1959	1975 1955 1975 1975	1975 1975 1975 1975	1975 1977 1977
BASIN Descriptor		0 0 0 0 0 0 0 0 0	900 44 44	00000 44444	% %% 4 4 4 4	00 4 4 4	0000 4 4 4 4	000 4 4
DRAINAGE AREA	27.20	90.50 113.00 192.00 87.80	1180.00 289.00 2070.00 61.90	950.00 280.00 4140.00 6160.00 2570.00	2006.00 164.00 2250.00 19400.00	131.00		
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LONGITUDE	95343	493755 494724 493332 492920	1490150 1474057 1490236 1490416 1491336	1473057 1463145 1473240 1494128 1501402	1500101 1501018 1500312 1512201 1503045	1511500 1522126 1513011 1513011	15 13920 15 13354 15 13027 15 13726 1490848	1504353 1504827 1492215 1440358
LATITUDE	± 5 ± 5 ± 5 ± 5 ± 5 ± 5 ± 5 ± 5 ± 5 ± 5	611325 611420 611828 612508	613018 614812 614100 613634 614232	630614 630710 624157 624604 623331	622049 621035 620632 615223 613241	610631 611244 610916 610918 611019	611152 611244 611823 611946 612836	622300 623157 624941 602339
STATION NAME AND LOCATION	CHESTER C AT ARCTIC	SHIP C NR ANCHORAGE AK 2 SHIP C AT ELMENDORF AFB NR ANCHORAGE AK 2 EAGLE R AT EAGLE RIVER AK 3 PETERS C NR BIRCHWOOD AK	KNIK R NR PALMER AK CARIBOU C NR SUTTON AK MOOSE C NR PALMER AK MATANUSKA R AT PALMER AK L SUSITNA R NR PALMER AK	SUSITNA RIVER NEAR DENALI AK MACLAREN R NR PAXSON AK SUSITNA R NR CANTWELL AK SUSITNA RIVER AT GOLD CREEK AK CHULITNA R NR TALKEETNA AK	TALKEETNA RIVER NEAR TALKEETNA AK SUSITNA RIVER AT SUNSHINE AK MONTANA C NR MONTANA AK SKWENTNA R NR SKWENTNA AK SUSITNA RIVER AT SUSITNA STATION AK	CHUITNA RIVER NEAR TYONEK AK CHAKACHATNA R NR TYONEK AK CHUITNA R AB CHUIT C NR TYONEK AK CHUIT C AT MOUTH NR TYONEK AK CHUIT C 1.6 MI AB MOUTH NR TYONEK AK	CHUITNA R BL WOLVERINE F NR TYONEK AK CHUIT C 5.4 MI AB MOUTH NR TYONEK AK BISHOP C NR TYONEK AK CAPPS C NR TYONEK AK EKLUTNA R BL POWER PLANT NR EKLUTNA AK	PETERS C AB MARTIN C AT PETERS CREEK AK PETERS C NR PETERSVILLE AK SUSITNA R AB PORTAGE C NR GOLD CREEK AK STILLWATEP C NP COPONVA AK
HYDROLOGIC Unit Code	19050002	19050002 19050002 19050002 19050002	19050002 19050002 19050002 19050002	19050002 19050002 19050002 19050002	19050002 19050002 19050002 19050002	19050002 19050002 19050002 19050002	19050002 19050002 19050002 19050002	19050002 19050002 19050002 19050003

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SUSP DISCHARGE	ববৰ্ষ	шшш	m m4	ш С <b>4</b>	NП	<b>АКПАА</b>	4445	
BEIS TRAS TAM G38			<del> </del>					
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OW WD RABY	197 197 197 197	197 197 197	197 197 197 197	197	197 197 197	197 196 197 197	197	
OW BEGIN	1970 1972 1970 1970	1970 1971 1948 1971 1948	1953 1948 1971 1971	1950 1967 1976 1950	1967 1972 1963 1950 1974	1970 1952 1968 1972 1975	1975 1954 1967 1964	
BASIN Descriptor		00 00 4 4 4 4	00 00 4 4 4	000 00	00 4 4	00 4 4 4	00 4 4	
ORAINAGE AREA		7.95 4.32 620.00 1770.00	2670.00 2670.00 880.00 22.70	420.00 70.50 20600.00	20.50 4.37 4.78 201.00 222.00	169.00 9.26	94.00 45.30	
TYPE OF SITE	N N N N N N N N N N N N N N N N N N N	N N N N N	N N N N N	N N N N N N N N N N N N N N N N N N N	MS MS MS NS	N N N N N N N N N N N N N N N N N N N	M S S S	
COUNTY	080 080 080	080 260 260 260 260	260 260 260 260	260 260 260	080 080 260	210 210 080 260	260 260 190 190	
3TAT2	002 002 002 002	000 000 000 000 000 000 000 000 000 00	002 002 002 002	005 002 002 002	000 000 000 000 000 000	000 000 000 000 000 000	005 002 002 002	
LONGITUDE	1440302 1440138 1441214 1441254	1441810 1441421 1451820 1453151 1452250	1452534 1452534 1451820 1450905 1451314	1451050 1451026 1442721 1442720	1453705 1454036 1461020 1455132 1455315	1455315 1492500 1492708 1440145 1450842	1451307 1453121 1300355 1303150	
LATITUDE	602404 6024104 602417 602225 6021444	602032 624303 621806 623115 621608	620320 620320 615710 612849 613538	613948 614005 612756 612800	603514 613641 604541 610549 610524	610524 600830 600410 602420 612855	613014 623139 560134 550829	
STATION NAME AND LOCATION	TROUT C NR CORDOVA AK CLEAR C NR CORDOVA AK SHEPHERD C BL LK CHARLOTTE NR CORDOVA AK CARBON C NR CORDOVA AK SHEPHERD C NR CORDOVA AK	DICK CREEK NEAR CORDOVA AK COPPER R TR NR SLANA AK GAKONA R AT GAKONA AK GULKANA RIVER AT SOURDOUGH AK GULKANA R AT GULKANA AK	TAZLINA R NR GLENNALLEN AK 1 TAZLINA R NR GLENNALLEN AK 8 KLUTINA R AT COPPER CENTER AK 1 LITTLE TONSINA RIVER NEAR TONSINA AK 8 L TONSINA R AB TONSINA R	TONSINA R AT TONSINA AK SQUIRREL C AT TONSINA AK CHITINA R NR CHITINA COPPER R NR CHITINA AK COPPER R NR CHITINA AK	POWER C NR CORDOVA AK HUMPBACK C NR CORDOVA AK WEST FORK OLSEN BAY CREEK NEAR CORDOVA AK LOWE R NR VALDEZ AK LOWE R IN KEYSTONE CANYON NR VALDEZ AK	LOWE R IN KEYSTONE CANYON NR VALDEZ AK RESURRECTION R AT SEWARD AK SPRUCE C NR SEWARD AK CLEAR C TR NR CORDOVA AK L TONSINA R SITE A† NR TONSINA AK	L TONSINA R SITE 4 NR TONSINA AK GULKANA R AT CMPGRD NR SOURDOUGH AK SALMON R NR HYDER AK RED R NR METLAKATLA AK	
HYDROLOGIC Unit Code	19050003 19050003 19050003 19050003	19050003 19050003 19050003 19050003	19050003 19050003 19050003 19050003	19050003 19050003 19050003 19050003	19050003 19050003 19050003 19050003	19050003 19050003 19050003 19050003	19050003 19050003 19060000 19060000	

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MOTZ G32	00000	00000	00000	00000	00000	00000	0000
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NIZAB ROT9183230	0000 4400 4400	000 4000 4400	004	024	004	00 40 40	000 4 4 4 4
DRAINAGE AREA	52.60 5.53 2.70 14.00	1.98 15.50 58.00 63.30 67.40	19920.00 151.00 8.29	32.50 226.00 4.57 9.76	12.10	15.50 2.50 3.96 56.90	43.20 179.00
TYPE OF	**************************************	N N N N N N N N N N N N N N N N N N N	A S S S S S S S S S S S S S S S S S S S	NA N	N N N N N	MS MS MS	3 3 3 3 0 0 0 0
YTNUOD	190 190 190 190	190 190 280 280	280 280 280 110	55 55	55555	55555	230
3TAT2	002 002 002 002	005 005 005 005 005	002 002 002 002	002 002 002 002	005 002 002 002	002 002 002 002	0000
LONGITUBE	1302358 1302700 1302738 1302423	1303058 1305203 1310255 1311512 1313812	1313812 1320800 1330636 1335306	1334150 1333640 1341850 1342405	1342515 1343442 1343519 1343137 1343240	1343227 1343634 1343750 1343810 1344740	1345307 1345500 1352110 1352040
LATITUDE	552234 552234 552451 552256	552542 552459 560315 561430	561248 564226 571024 581056 581056	581000 581210 581630 581825	582330 582147 582146 582531 582505	582448 582353 582340 582256 583126	583906 584900 593135 593043
STATION NAME AND LOCATION	O KETA R AB HILL C NR KETCHIKAN AK O HILL C AB WHITE C NR KETCHIKAN AK O WHITE C NR KETCHIKAN AK O HILL C NR MOUTH NR KETCHIKAN AK O KETA R NR KETCHIKAN AK	O BEAVER CREEK NEAR KETCHIKAN AK O WINSTANLEY C NR KETCHIKAN AK O KLAHINI R NR BELL ISLAND AK O EF BRADFIELD R NR WRANGELL AK O HARDING R NR WRANGELL AK	O FY78 CHANGE OPERATION OWDC69151 TO O STIKINE R NR WRANGELL AK O FARRAGUT R NR PETERSBURG AK O LONG R AB LONG LK NR JUNEAU AK O LONG R AB LONG LK NR JUNEAU AK	O LONG R NR JUNEAU AK O SPEEL R NR JUNEAU AK O TAKU R NR JUNEAU O SHEEP C NR JUNEAU AK O GOLD C AT JUNEAU AK	O LEMDN C NR JUNEAU AK O JORDON C NR AUKE BAY AK O DUCK C NR AUKE BAY AK O NUGGET C NR AUKE BAY AK O NUGGET C NR AUKE BAY AK	O STEEP C NR AUKE BAY AK O MONTANA C NR AUKE BAY AK O LAKE C AT AUKE BAY AK O AUKE C AT AUKE BAY AK O HERBERT R NR AUKE BAY AK	DAVIES C NR AUKE BAY AK O ANTLER R AT BERNERS BAY AK O WEST C NR SKAGWAY AK O TAIYA R NR SKAGWAY AK
HYDROLOGIC Unit Code	19060000 19060000 19060000 19060000	19060000 19060000 19060000 19060000	19060000 19060000 19060000 19060000	19060000 19060000 19060000 19060000	19060000 19060000 19060000 19060000	19060000 19060000 19060000 19060000	19060000 19060000 19060000 19060000

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OW BEGIN		1962 1968 1948 1965	1949 1976 1968 1968	1963 1963 1978 1978 1964	1977 1978 1965 1977 1976	1975 1977 1967 1967 1975	1967 1966 1966 1965	1968 1965 1979 1979	
BASIN ROT9183230		0004 0004 0004 0004	00 4 4 4	900 4 4 4	00000 4 4 4 4 4	9 9 9 9 4 4 4 4	00 00 004 4	000 4 4 4	
DRAINAGE AREA		190.00 5.29 2.81 13.50 32.10	46.10 17.40 3.38	5.90 11.20 6.56 8.45 .09	. 99 1.27 1.46 2.20 3.27	31.90 31.00 7.41 17.50 2.28	56.20 10.20 4.48 8.00 14.50	37.70 3.02 12.90	
TYPE OF SITE		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N	
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STATION NAME AND LOCATION		CHILKAT R AT GORGE NR KLUKWAN AK WHIPPLE C NR WARD COVE AK PERSERVERANCE C NR WACKER AK KETCHIKAN C AT KETCHIKAN AK FISH C NR KETCHIKAN AK	D FISH C NR KETCHIKAN AK D KLAWAK R NR KLAWOCK AK D NB TROCADERO C NR HYDABURG AK D HYDABURG R AT HYDABURG AK D PERKINS C NR METLAKATLA	O OLD TOM C NR KASAAN AK D BIG C NR POINT BAKER AK D NAVY LK OUTLET NR MEYERS CHUCK AK D NAVY C NR MEYERS CHUCK AK MAVY C NR MEYERS CHUCK AK MILL C AT WRANGELL AK	ZAREMBO C NR WRANGELL AK D ZAREMBO C NR POINT BAKER AK D HAMMERS SL AT PETERSBURG AK O MUNICIPAL WATERSHED C NR PETERSBURG AK D ROCKY PASS C NR POINT BAKER AK	D NAKWASINA R NR SITKA O GREEN LK OUTLET NR SITKA AK O DEER LK OUTLET NR PORT ALEXANDER AK O TAKATZ C NR BARANOF AK O KALININ BAY TR NR SITKA AK	HASSELBORG C NR ANGDON AK KADASHAN R AB HOOK C NR TENAKEE AK O HOOK C AB TR NR TENAKEE AK O HOOK C NR TENAKEE AK	D TONALITE C NR TENAKEE AK O KADASHAN R NR TENAKEE AK O INDIAN R NR HEADWATERS NR TENAKEE AK O INDIAN R NR TENAKEE AK	
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STATION NAME AND LOCATION	HAWAII	FY77 CHANGE OPERATION OWDC73374 TO WAILUA R AT WAILUA KAUAI KAHANA STR AT ALT 30 FT NR KAHANA, OAHU, HI FY76 CHANGE OPERATION OWDC67716 TO WAIMEA R AT MOUTH AT WAIMEA KAUAI	HALAWA ST AT MOUTH AT AIEA MOANALUA ST AT MOUTH NR HONOLULU KAPALAMA ST AT MOUTH NR HONOLULU NUUANU ST AT MOUTH NR HONOLULU WAINIHA R BL POWER PLANT NR HANALE	WAILUKU R NR HILO KOLEKOLE ST NR HONDMU HI WAIULAULA GULCH NR KAWAIHAI HI HILEA ST NR HONUAPO HI OHEO GULCH NR KIPAHULU HI	PIINAAU ST NR KEANAE HI WAIHEE R NR WAIHEE HI MAUNALEI GULCH LANAI HI KAUMALAPAU GULCH - LANAI HI UNNAMED TRIB TO WAIKAHULU BAY HI	KANELOA GULCH - KAHOOLAWE HI WAILUA ST NR WAILUA HI HALAWA ST AT AIEA HI KANEOHE ST AT KANEOHE HI WAIAHOLE ST AT WAIAHOLE HI	HULEIA ST AT NAWILIWILI HI HOEA ST NR KEKAHA HI KEANAUHI VALLEY NIHAU HONUAULA VALLEY - NIHAU HI KAHALUU STREAM NR KAHALUU HI	KUOU ST NR KANEOHE DAHU HI HOOLEIANAIWA ST NR KANEOHE HI WB ANDLANI ST NR KANEOHE DAHU HI EB ANDLANI ST NR KANEOHE OAHU HI	
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LATITUDE	193830 194315 194256	194343 194600 195255 193812 194310	203721 203801 205647 205854 210931	210759 210945 211039 210606 212020	213109 212932 212957 213356 213124	213016 212820 212813 212433 212311	212357 212348 212307 212329	
STATION NAME AND LOCATION	KAMDDALII ST AT ALT 120F N KANEDHE FY77 CHANGE OPERATION OWDC73372 TO WAIAKEA STREAM NR MOUNTAIN VIEW, HAWAII, HI WAILUKU RIVER NR KAUMANA, HAWAII, HI	WAILUKU RIVER AT HILD, HAWAII, HI HONOLII STREAM NR PAPAIKOU HAWAII HI KOLEKOLE STREAM NR HONOMU, HAWAII, HI WAIAHA ST NR HOLUALOA HI KAPEHU STREAM AT PIIHONUA	KEPUNI GULCH NR KAHIKINUI HDUSE HI HAWELEWELE GULCH NR KAUPO HI WAIHEE RIVER NR WAIHEE, MAUI, HI KAHAKULDA STREAM NR HONDKOHAU, MAUI, HI HALAWA STREAM NR HALAWA, MOLOKAI, HI	FY77 CHANGE OPERATION OWI WAIKOLU STR BL PIPE CROSS KAKAAKO GULCH NR MAUNA LE WAIALUA STREAM AT WAIALUJ KALIHI STREAM AT MOUTH	NF KAUKONAHUA STREAM AB RB NR WAHIAWA, DAHU, H S KAUKONAHUA STREAM AT E PUMP RSVR WAHIAWA. S R BR OF SF KAUKONAHUA STREAM NR WAHIAWA, DAHU S KAUKONAHUA ST AT WAIALUA HI POAMOHO STREAM NEAR WAHIAWA, DAHU, HI	MAKAHA STREAM NR MAKAHA, DAHU, HI KAUPUNI STREAM AT ALT 374 FT NR WAIANAE,OAHU KIPAPA STREAM NR WAHIAWA, OAHU, HI KIPAPA STREAM NEAR WAIPAHU, OAHU, HI WAIKELE STREAM AT WAIPAHU, OAHU, HI	WAIAWA STREAM NR PEARL CITY, OAHU, HI WAIMALU STREAM NR AIEA OAHU, HI KALAUAO STREAM AT MOANALUA RD,AT AIEA,OAHU, WJANALUA STREAM NY KANEDHE, DAHU, HI	
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STATION NAME AND LOCATION	MOANALUA STREAM TRIB NR KANEOHE, OAHU, HI MOANALUA STREAM TRIBUTARY NEAR AIEA, OAHU, H MOANALUA STREAM NEAR HONOLULU, OAHU, HI MOANALUA STREAM NEAR AIEA, OAHU, HI MOANALUA STREAM NR TRIPLER HOSPITAL,OAHU, HI	KALIHI STREAM NR KANEOHE, OAHU, HI KALIHI STREAM NR HONOLULU, OAHU, HI KALIHI STREAM AT KALIHI, OAHU, HI WAIHI STREAM AT HONOLULU, OAHU, HI	FY77 CHANGE OPERATION OWDC73389 TO WAIMANALO STREAM AT WAIMANALO OAHU, HI MAKAWAO STREAM NEAR KAILUA, OAHU, HI MAUNAWILI STREAM AT HWY 61 N KAILUA, OAHU,HI KAWAINUI CA AT KAILUA HI	KAMDOALII STREAM BL KUOU ST NR KANEOHE,OAHU. LULUKU ST A ALT 220 F NR KANDHE HI KAMOOALII STREAM BELOW LULUKU STREAM, OAHU H KAMOOALII STREAM AT KANEOHE, OAHU, HI KANEOHE STREAM AT KANEOHE OAHU, HI	FY76 CHANGE OPERATION OWDC73391 TO KAHALUU STREAM AT KAHALUU HI WAIHEE STREAM AT KAHALUU, OAHU, HI FY77 CHANGE OPERATION OWDC56874 TO KAMANANUI STREAM AT PUPUKEA MIL RD NR MAUNAW	KAIWIKOELE STREAM TRIB NR MAUNAWAI,OAHU.HI KAMANANUI STREAM AT MAUNAWAI, OAHU, HI FY77 CHANGE OPERATION OWDC73397 TO HELEMANO STREAM AT HALEIWA, OAHU, HI OPAEULA STREAM NR WAHIAWA, OAHU, HI	FY77 CHANGE OPERATION OWDC73358 TO KAMODALII STR AB HECO SUBSTA NR KANEOHE OAHU KAMODALII STR AT OLD PALI RD NR KANEOHE OAHU KUOU STR BELOW BWS WELLS NR KANEOHE OAHU HI	
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STATION NAME AND LOCATION	ANDLANI STR AT LIKELIKE HWY KANEOHE OAHU HI UNNAMED TRIBUTARY TO KANEOHE STREAM, OAHU, H KAHALUU STR AT ALT 10 FT AT KAHALUU OAHU HI KAHALUU STREAM BL WAIHEE STR CONFL, OAHU, HI KAHALUU STR AT HWY 83 AT KAHALUU OAHU HI	WAIMEA RIVER NR WAIMEA, KAUAI, HI HANAPEPE R AT HANAPEPE HI HULEIA STREAM NR NAWILIWILI, KAUAI, HI KAPAA ST AT OLD CROSSING NR KEALIA FY77 CHANGE OPERATION OWDC73351 TO	PUUKUMU ST NR KILAUEA HI LA SA FUA RIVER NEAR UMATAC GUAM UMATAC RIVER AT UMATAC GUAM GEUS RIVER NR MERIZO GUAM TALOFOFO RIVER NEAR TALOFOFO, GUAM	PAGO RIVER NR ORDOT GUAM BENOKI-GAWA AT BENOKI, OKINAWA YONA-GAWA AT YONA, OKINAWA TAKAZATO-GAWA NEAR HAMA, OKINAWA TAIHO-OKAWA AT TAIHO OKINAWA RK	RIGHT BRANCH OF SF HENAN-GAWA NR TSUHA, OKIN HANECHI-OKAWA AT KAWAKAMI OKINAWA OI-KAWA AT JINGUSUKU, OKINAWA YONABARU-GAWA BL ZUKEYAMA DAM OKINAWA BISHI-GAWA AT KADENA OKINAWA	NAGATA-GAWA AT KADENA OKINAWA MACHINATO-GAWA NR OJANA, OKINAWA TENGAN-GAWA AT TENGAN, OKINAWA OKUKUBI-GAWA AT KIN, OKINAWA KANNA-GAWA NR KANNA, OKINAWA	UFU-KAWA NEAR GINDZA, OKINAWA LEFT FORK O-KAWA NR KUSHI, OKINAWA OURA-GAWA AT OKAWA OKINAWA FUKUJI-GAWA NR YU3ARU OKINAYA	
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LONGITUDE	128 1013 128 1525 128 1555 128 1553
LATITUDE	2637 16 263733 263743 26424 1 26443 1
STATION NAME AND LOCATION	FUKUUJ-GAWA AT FUKUUJ OKINAWA RK ARA-KAWA AT ARAKAWA OKINAWA RK AHA-GAWA AT AHA, OKINAWA FUN-GAWA NEAR AHA OKINAWA
HYDROLOGIC Unit Code	20 100009 20 100009 20 100009 20 100009

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STATION NAME AND LOCATION	RIO GUAJATACA AT LARES, PR RIO GAMUY NR LARES, PR BIO CEMUY NR LARES, PR	RIO GRANDE DE ARRECIBO NR ADJUNTAS RIO PELLEJAS AT CENTRAL PELLEJAS, PR QUEBRADA AZUL AT CENTRAL PELLEJAS, PR RIO PELLEJAS BL CENTRAL PELLEJAS RIO PELLEJAS NR UTUADO PR RIO VIVI NR CENTRAL PELLEJAS PR RIO VIVI DIVER TUNNEL NR UTUADO PR	QUEBRADA JORDAN NR UTUADO PR RIO GRANDE DE ARECIBO NR UTUADO PR RIO JAUCA NR JAYUYA PR RIO CAONILLAS NR JAYUYA, PR RIO LIMDN NR HACIENDA ETUON PR	RIO GRANDE DE ARECIBO BELOW LAGO DOS BOCAS. RIO GRANDE DE ARECIBO BL LAGO DOS BOCAS FLA. RIO TANAMA NR UTUADO, PR RIO GRANDE DE MANATI NR MOROVIS, PR RID SANA MUERTO NR OROCOVIS, PR	RIO BAUTA NR OROCOVIS, PR RIO GRANDE DE MANATÍ AT CIALES, PR RIO GRANDE DE MANATÍ AT HWY 145 AT CIALES, P RIO CIALITOS AT HWY 649 AT CIALES, PR RIO COROZAL AT COROZAL, PR	RIO CIBUCO BL CDROZAL PR CANAL DIVERSION LAGO GUAJATACA, PR RIO GUAJATACA ABOVE MOUTH NR QUEBRADILLAS, P RIO CAMUY AT LA CUESTA, PR RID CAMUY NR CAMUY PR	RIO TANAMA AT CHARCO HONDO, PR RIO GRANDE DE ARECIBO AT CENTRAL CAMBALACHE, RIO GRANDE DE MANATI AT HWY 667 AT MANATI, P RIO GRANDE DE MANATI AT HIGHWAY 2	
HYDROLOGIC Unit Code		2 101000 2 101000 2 101000 2 101000 101000 101000 101000 101000 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 10100 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1	21010001 21010001 21010001 21010001	21010001 21010001 21010001 21010001	21010001 21010001 21010001 21010001 21010001	21010001 21010002 21010002 21010002 21010002	21010002 21010002 21010002 21010002	

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BASIN DESCRIPTOR		900	004	004	004	004	004 004	
DRAINAGE AREA	. 2 9	92.50	120.00	94.30 108.00 16.60 71.20	83.30 97.00	5.23 18.30 27.90 12.30	46.00 12.90 19.30 21.40	
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LONGITUDE	0663207 0662650 0662142		0670846 0670413 0670827 0664751	0670256 0670647 0670943 0665946 0670533	0670706 0670940 0655828 0655435 0653842	0655802 0660158 0660127 0660820 0661227	0662210 0662534 0662743 0662852	
LATITUDE	182552 182829 182600 182038	2653 2742 0411 0506	180829 181202 181227 181203 181528	18 1653 18 1650 18 1629 18 2008 18 2 14 2	182237 182403 182327 182412 181934	175849 180204 180015 175730 180240	180352 180307 180609 180617	
STATION NAME AND LOCATION	RIO GRANDE DE MANATI AT HWY 2 NR MANATI, PR LAGUNA TORTUGUERO OUTLET NR VEGA BAJA, PR RIO CIBUCO NR VEGA BAJA, PR RIO UNIBON NR MOROVIS, PR	RIO CIBUCO AT VEGA BAJ RIO CIBUCO AT CENTRAL RIO GUANAJIBO AT LA PI RIO GUANAJIBO AT HWY 1 RIO ROSARIO AT ROSARIO	RID GUANAJIBO NR HORMIGUEROS, PR RIO YAGUEZ AT PRESADA DE MAYAGUEZ, PR RID YAGUEZ AT MAYAGUEZ, PR R YAHUECAS HWY 135 NR ADJUNTAS PR RIO GRANDE DE ANASCO NR LARES, PR	RIO GRANDE DE ANASCO NR SAN SEBASTIAN, PR RIO GRANDE DE ANASCO AT EL ESPINO, PR RIO GRANDE DE ANASCO NR ANASCO, PR RIO CULEBRINAS AT SAN SEBASTIAN, PR RIO CULEBRINAS AT HWY 404 NR MOCA, PR	RIO CULEBRINAS NR MOCA, PR RIO CULEBRINAS NR AGUADA, PR QUEBRADA BLASINA NR CAROLINA, PR RIO GRANDE DE LOIZA AT CENTRAL CANOVANAS, PR RIO FAJARDO BELOW FAJARDO, PR	RIO JACABOA AT HACIENDA SAN ISIDRO, PR RIO GRANDE DE PATILLAS NR PATILLAS RIO GRANDE DE PATILLAS AT PATILLAS, PR RIO GUAMANI NR GUAYAMA, PR RIO MAJADA AT LA PLENA, PR	RIO COAMO NR COAMO PR RIO DESCALABRADO NR LOS LLANOS PR RIO TOA VACA AT HWY 150 NR VILLALBA, PR RIO TOA VACA NR VILLALBA, PR	
HYDROLOGIC Unit CODE	21010002 21010002 21010002	2 10 10 00 0 2 2 10 10 00 0 2 2 10 10 00 0 3 2 10 10 00 0 3	21010003 21010003 21010003 21010003 21010003	21010003 21010003 21010003 21010003	21010003 21010003 21010004 21010004 21010004	21010004 21010004 21010004 21010004 21010004	21010004 21010004 21010004 21010004	

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DRAINAGE AREA	9.70 7.80 25.60 10.40	24.20 18.50 20.80	54.80 8.65	8.65 200.00 18.50 31.90 41.80	71.90	1.55 1.65 8.07 12.50	1.77
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3TAT2	072 072 072 099	072 072 072 072 072	072 072 072 072	072 072 072 072 072	072 072 072 072 072	072 072 072 072 072	072 072 072 072
LONGITUDE	0663346 0663453 0663512 0663803	0664319 0664559 0664703 0664807	0664649 0664914 0665458 0661344 0661528	0661516 0661517 0660839 0660827 0660813	0660558 0660610 0660825 0660922	0660326 0660333 0660340 0660324 0660410	0660618 0660053 0660212 0660516
LATITUDE	180510 180422 180218 180445	180302 180041 180324 180252	180040 175922 175844 180937	182339 182350 181439 181810 182008	181951 182005 182353 182417 182501	182044 182019 182215 182348	182503 182503 182550 182550 183537
STATION NAME AND LOCATION	RIO INABON AT REAL ABAJO, PR RIO CERRILLOS NR PONCE, PR RIO BUCANA NR PONCE, PR RIO PORTUGUES NR PONCE, PR RIO PORTUGUES AT HWY 2 BY PASS AT PONCE, PR	RIO TALLABOA AT PENUELAS PR RIO MACANA NR GUAYANILLA, PR RIO GUAYANILLA AT BARRIO MACANA, PR RIO GUAYANILLA NR GUAYANILLA, PR RIO GUAYANILLA AT GUAYANILLA PR	RIO GUAYANILLA AT CENTRAL RUFINA, PR RIO YAUCO AT CENTRAL SAN FRANCISCO, PR RIO LOCO AT GUANICA, PR RIO DE LA PLATA AT PROYECTO LA PLATA, PR RIO LAJAS AT TOA ALTA PR	RIO LAJAS AT TOA ALTA P R RIO DE LA PLATA AT TOA ALTA, PR RIO DE BAYAMON NR AGUAS BUENAS, PR RIO DE BAYAMON AT HWY 174 NR BAYAMON, PR RIO DE BAYAMON NR BAYAMON, PR	RIO GUAYNABO AT LA MUDA NEAR GUAYNABO,P.R. RIO GUAYNABO AT HWY 836 NEAR GUAYNABO, P.R. RIO DE BAYAMON AT BAYAMON PR R DE BAYAMON AT H 167 AT BAYAMON RIO DE BAYAMON AT BAYAMON FLOOD-CHANNEL, PR	QUE LAS CURIAS NR RIO PIEDRAS PR QUEBRADA LAS CURIAS TRIBUTARY NR RIO PIEDRAS RIO PIEDRAS NR RIO PIEDRAS, PR RIO PIEDRAS AT RIO PIEDRAS, PR RIO PIEDRAS AT HATO REY, PR	QUE MARGARITA AT CA PARRA HTS PR SAN JOSE LAGOON NO 1 AT SAN JUAN, PR SAN JOSE LAGOON NO 2 AT SAN JUAN, PR SAN JIJAN BAY MD 5 AT SAN JIJAN, PP
HYDROLOGIC Unit Code	21010004 21010004 21010004 21010004 21010004	2 10 10004 2 10 10004 2 10 10004 2 10 10004 2 10 10004	21010004 21010004 21010005 21010005	21010005 21010005 21010005 21010005 21010005	21010005 21010005 21010005 21010005 21010005	21010005 21010005 21010005 21010005	2 10 10005 2 10 10005 2 10 10005 2 10 10005

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BASIN DESCRIPTOR	014 003 004	00 00 00 4 4	00000 00000 00000	000	000	000
DRAINAGE AREA	89.80 17.50 5.40 85.85	16.40 60.20 9.84 2.75	2.23 8.62 7.31 6.88 11.80	13.50 14.90 21.60 4.84 17.60	6.65 17.30 4.69 17.20	7.89 39.15 5.15 12.40
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СОПИТУ	013 013 042	013 031 013 043 059	059 059 059 059 059	059 026 026 051 051	042 034 034 075	075 075 047 047
3TAT2	072 072 072 072	072 072 072 072 072	072 072 072 072 072	072 072 072 072 072	072 072 072 072 072	072 072 072 072
LONGITUDE	0660636 0660035 0660126 0660213	065534 0655805 0660233 0655321	0654922 0654849 0655030 0654504 0654614	0654550 0654142 0653907 0654130 0654657	0655211 0655041 0654938 0655733 0655703	0655342 0655624 0655624 0655419
LATITUDE	182709 184535 181511 181528	181258 181530 181734 181908 182102	181851 182137 182054 181946 182203	182227 181756 181911 181316 181309	18 1027 180937 180849 180453	180435 180345 1800131 180024
STATION NAME AND LOCATION	SAN JUAN BAY NO 3 AT SAN JUAN, PR RIO GRANDE DE LOIZA AT CAGUAS, PR RIO CAGUITAS AT HWY 30 AT CAGUAS PR RIO BAIROA NR CAGUAS, PR RIO VALENCIANO NR LAS PIEDRAS PR	RIO VALENCIANO NR JUNCOS, PR RIO GURABO AT GURABO, PR RIO CANAS ABOVE LAGO LOIZA, PR RIO CANOVANAS NR CAMPO RICO, PR RIO HERRERA NR COLONIA DOLORES PR	RIO ESPIRITU SANTO NR EL VERDE PR RIO ESPIRITU SANTO NR RIO GRANDE, PR RIO GRANDE NR EL VERDE, PR RIO MAMEYEZ NR SABANA PR RIO MAMEYES AT HWY 191 AT MAMEYES, PR	RIO MAMEYES AT MAMEYES, PR RIO FAJARDO NR FAJARDO, PR RIO FAJARDO AT FAJARDO, PR QUEBRADA PALMA AT DAGUAO, PR RIO BLANCO AT RIO BLANCO, PR	RIO HUMACAO AT LAS PIEDRAS, PR RIO HUMACAO NR HUMACAO PR RIO HUMACAO AT HWY 3 AT HUMACAO, PR RIO GUAYANES NR COLONIA LAURA, PR RIO GUAYANES NR YABUCOA, PR	RIO LIMONES NR YABUCOA, PR RIO GUAYANES ABV MOUTH AT PLAYA DE GUAYANES. RIO MAUNABO AT LIZAS, PR RIO MAUNABO AT MAUNABO, PR
HYDROLOGIC Unit Code	21010005 21010005 21010005 21010005 21010005	21010005 21010005 21010005 21010005 21010005	21010005 21010005 21010005 21010005 21010005	21010005 21010005 21010005 21010005	21010005 21010005 21010005 21010005 21010005	21010005 21010005 21010005 21010005

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LATITUDE	84200 1	485500 1 485700 1 485700 1 485500 1 485500 1 485500 1	480400 1 480800 1 481500 1 481400 1	480500 1 475800 1 480600 1 482700 1	182400 1 182200 1 182200 1 182000 1	82000 84600 83500 83800	484200 1 484200 1 481900 1 482000 1	
STATION NAME AND LOCATION		MISSION CREEK EF MISSION CREEK LONG CANYON CREEK SMITH CREEK COW CREEK UPPER COW CREEK SMITH CREEK-UNION ROAD BOUNDARY AT USGS GAGE SITE		GRANITE CR NORTH GOLD CR FISH CR NF GROUSE CR GROUSE CR	TRAPPER CR STEVE CR NORTH DONE LITTLE SAND CREEK	LITTLE SAND TRIB 2 BOULDER CREEK MATHAWIG CREEK INDIAN CREEK REEDER CREEK	FEDAR CREEK ZERO CREEK SLOUGH CREEK MOSQUITO CREEK	
HYDROLOGIC Unit Code								

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ORGANIZATION 3000	USFS	USFS USFS USFS USFS USFS	USFS USFS USFS USFS	USFS USFS USFS	USFS USFS USFS USFS	USFS USFS USFS USFS USFS	USFS USFS USFS	
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LONGITUDE	1170300	1170300 1164500 1154800 1155000 1160300	1152100 1152100 1152600 1150100	1152300 1152200 1152200 1153700	1154200 1155200 1155300 1155400	153600 153600 154800 160600	1160600 1161800 1160300	
1 ATITUDE	482000 482100 482800	483000 482200 470400 · 470500 470300 465800	47 1000 470500 470400 471400	47 1000 47 1400 47 2000 47 1600	47 1400 47 0800 47 1500 47 0900 47 1400	471300 471300 471500 470700 471800	471600 472200 471600 471600	
STATION NAME AND LOCATION	MILLERS CREEK BEAR PAW CREEK ANDERSON CREEK	WATER AT FR1268	CR R CR CR ABOVE DREDGING	GOLD CR.AT EF BRIDGE FLOAT CR INDIAN CR RYE CR BLUEBIRD CR	SKOOKUM CR EF FISHHOOK FLEMMING CR OUTLAW CR SIWASH CR	PROSPECTOR CR UPPER PROSPECTOR CR KELLY CREEK UPPER MARBLE CR EF BIG CR	MUD CABIN CR FALLS CR BLACK PRINCE CR AGATHA CR	
HYDROLOGIC UNIT CODE								

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STATE	016 016 016 016	016 016 016 016	016 016 016 013	013 013 016 016	016 026 026 026 017	017 017 017 027 053	053 053 053	
LONGITUDE	1163000 1162000 1163500 1163300	1163500 1162500 1161700 1161300	1160800 1160800 1161100 1160900 0834656	0834303 0843813 0843755 1122502	1122542 0885345 0885945 0884700 0892939	0892547 0883936 0881923 0913119 1172915	1174337 1173100 1175100 1180907	
LATITUDE	471100 470100 470500 470400	470500 465900 470300 470200	470100 470100 470100 470000 344702	344430 345918 345451 423054	424731 460945 461115 462940 374746	373400 373104 372955 473806	461345 461652 461400 460345	
STATION NAME AND LOCATION	ST MARIES RIVER AT MASHBURN EAST FORK EMERALD CR AT FR447 BR PRESTON CR ABOVE MOUTH EF CHARLIE CR LITTLE EF EMERALD CR ABOVE MOUTH	HUME CR AT CHARLIE CR CROSSING SWAMP CR AT FR447 >STAPLES> CR AT FS BOUNDARY WF MERRY CR TWO BIT CR	WINDY CR GOLD CENTER CREEK FLEWSIE CREEK GRAMPS CREEK FS ROAD BRIDGE 3000FT S WHITE CO	SMITH CR BELOW RECREATION AREA BRIDGE 1000 FT S OF TENN ST LINE 1000 FT BELOW ROUGH CREEK S FK MINK CR ABV CONF W/WEST FK W FK MINK CR AT CITY INTAKE	GIBSON JACK CR AT CITY INTAKE COOKS RUN US-2 S. BR. PAINT US-2 5.1MI.O85DEG. FR BUTTERMILK HILL TIMBER SALE TMT	HUTCHINS CK 10 MI NW JONESBORO BAY CREEK 4 MI N GLENDALE IL BIG CREEK 4 MI N ELIZABETHTOWN STONY R.10 MI.W.ISABELLA,MINN.	LITTLE TUCANNON AT MOUTH PATAHA CR 1/2 MI ABV NFS BOUNDRY JIM CREEK MILL CR BELOW BLUE CR	
HYDROLOGIC UNIT CODE								

NOT2 G32 AIG3M		0000	00000	0000	00000	00000	00000	0000
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3TAT2		004	0041	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	0 0 0 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
LONGITUDE		175345 180630 180600 181245 181145	5 4 4 4 4	184137 184345 185107 183307 185430	185500 182400 182900 182800	184807 185600 185737 185645	1184537 1184537 1184630 1184730	1185500 1185700 1185800 1185900
LATITUDE	!	455315 1 455315 1 455300 1 454047 1	4 4 5 5 5	451030 1 445830 1 450045 1 445937 1	445500 144500 1445000 1445000 1	445352 1 445937 1 445800 1 445945 1	445005 1 445130 1 445237 1 445352 1	445900 1 445600 1 445800 1 445800 1
STATION NAME AND LOCATION		LITTLE LODKINGGLASS CR N FK WALLA WALLA R SOUTH FORK WALLA WALLA S FK UMATILLA R ABV THOMAS CR THOMAS CR ABV S FK UMATILLA R		BOWMAN CR TROUGH CR BIG MEADOW CR N FK JOHN DAY R	N FK JOHN DAY R N FORK JOHN DAY RUBY CREEK 200 YDS ABOVE CLEAR TENCENT LEACH PAD RASMUSSEN MINING	DESOLATION CR DESOLATION CR E FK MEADOW BROOK MEADOW BROOK HOWARD CR	SPONGE CR BATTLE CR WELCH CR BRUIN CR UUNKENS CREEK	HOG CREEK AT CULVERT S-763 BULLY CREEK ABOVE BRUSH CREEK SMITH CREEK AT FOREST BOUNDARY WEST FK MEADOW BRK ABOVE SMITH
HYDROLOGIC Unit Code								

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ZUSP DISCHARGE	<b>4044</b>		22	7777	7777	7777	7777
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COUNTY	023 023 023 069 021	021 083 075 075 039	013 021 033 033 033	021 021 033 033	033	033 033 033 033	033 021 033 033
31AT2	041 041 041 051	051 054 054 054 016	021 034 042 042 042	042 042 042 042	000 047 047 047 047 047	0000 442 642 642 642	0000 444 644 644
LONGITUDE	1190100 1184608 1184600 1194200 0811414	0811329 0794244 0801215 0801032	0745208 0783924 0783306 0782656	0783305 0782947 0782934 0783202 0783320	0783129 0782814 0782659 0782542 0782515	0782610 0782650 0782643 0782556 0782556	0782228 0782753 0782422 0782140
LATITUDE	445600 445004 445200 445430 370732	370734 385503 381853 381748 440300	401720 410311 405830 410210	403340 403913 404019 404435 404620	404927 404830 404930 404732 404911	404945 405104 405137 405248 405254	405727 405551 405934 405948
STATION NAME AND LOCATION	WEST FORK MEADOW BRK AT NF BDY PARK CRETK AT S812 BEEMAN CREEK AT MOUTH TAMARACK CR HUNTING CAMP CREEK 76-06	HUNTING CAMP CREEK 76-07 BICKLE RUN 8.5 MILES EAST ELKINS WILLIAMS RIVER 19 MI NE RICHWD NF SOUIRREL C NR SQUIRREL ID	STONY FK AT NOETOWN DELAWARE R AT WASHINGTON CROSSING NU L ANDERSON C NR ROCKTON, PA KRATZER RN AT BRIDGEPORT, PA MOOSE C AT CLEARFIELD, PA	CLEARFIELD C AT ASHVILLE, PA CLEARFIELD C AT FRUGALITY, PA POWELL RN AT VAN ORMER, PA BLAIN RN AT COALPORT, PA N WITMER RN AT IRVONA, PA	PINE RN NR IRVONA, PA CLEARFIELD C NR MADERA, PA SHOFF MINE AT MADERA, PA L MUDDY RN AT SMOKE RUN, PA MUDDY RN AT MADERA, PA	JAPLING RN AT MADERA, PA PINE RN NR MADER, PA LOST RN AT MADERA, PA UPPER MORGAN RN NR KELLEYTOWN, PA POTTS RN AT KELLYTOWN, PA	MORGAN RN NR MINERAL SPRINGS, PA L CLEARFIELD C NR GLEN RICHEY, PA LONG RN AT MOUNT HOPE, PA ROARING RN AT MINERAL SPRINGS, PA
HYDROLOGIC Unit Code							

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90T2 G32 AIG3M	00000	00000	00000	00000	00000	00000	0000
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3TAT2	042 042 042 042 042	042 042 042 042	042 042 042 042	042 042 042 042	042 042 042 042	042 042 042 042	042 042 042 042 042
LONGITUDE	0781202 0781133 0781025 0780810 0780833	0780336 0780322 0780759 0780251 0782406	0774647 0774342 0775212 0775207 0775625	0771725 0771725 0782005 0771129 0765713	0765502 0765825 0761953 0762638 0782910	0782904 0782623 0782843 0782401 0782344	0784510 0784556 0784604 0781541
LATITUDE	405449 405518 405714 405640 405739	410210 410208 410745 410659 411629	411945 411950 410424 410522 410302	412608 412608 412425 411915 413033	413058 412912 412731 412722 402947	402954 402804 402509 403827 403822	403622 403742 403819 400741
STATION NAME AND LOCATION	ONEMILE RN NR PHILIPSBURG, PA HAWK RN NR HAWK RUN, PA UNNAMED TRIB TO MOSHANNON C AT MUNSON, PA BLACK BEAR RN NR WINBURNE, PA SULPHUR RN NR WINBURNE, PA	MOSHANNON C NR MOSHANNON, PA BLK MOSHANNON C AT MOSHANNON, PA MOSQUITO C NR KARTHAUS, PA STERLING RN NR PINE GLEN, PA MEDIX RN NR MEDIX RUN, PA	DRURY RN AT DRURY RUN, PA PADDY RN NR RENOVO, PA SANDY RN NR SNOW SHOE, PA WOLF RN NR SNOW SHOE, PA N FK BEECH C AT CLARENCE, PA	L PINE C NR ENGLISH CENTER, PA ENGLISH RN AT ENGLISH CENTER, PA OTTER RN AT CARSONTOWN, PA LARRYS C NR SALLADASBURG, PA RED RN AT RALSTON, PA	MINERS RN NR RALSTON, PA FROZEN RN NR RALSTON, PA LOYALSOCK C AT LOPEZ, PA BIRCH C NR RINGDALE, PA GLENWHITE RN NR ALTOONA, PA	KITTANING C NR ALTOONA, PA SUGAR RN NR ALTOONA, PA BLAIRS GAP RN NR FOOT OF TEN, PA BELLS GAP RN NR BLANDBURG, PA SHAW RN NR BLANDBURG, PA	LESLE RN NR CARROLLTOWN, PA W BR SUSQUEHANNA R NR SPANGLER, PA FOX RN AT SPANGLER, PA SANDY RN AT HOPEWELL, PA
HYDROLOGIC Unit Code							

ROTZ G32 AIG3M	م م م م	00000	00000	ممممم	0 0 0 0 0	00000	0000	
NOSTANIZATION 3000	USGS USGS USGS USGS	<b>Ს ᲡᲡᲡᲡᲡ</b>	USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS	
SUSP DISCHARGE	7777		77777	77777	77777	иииии	NNNN	
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LONGITIDE	15 12 50 50	07845454 0784515 0814828 0781631	0781708 0782143 0782400 0782343 0782334	0782708 0783922 0783833 0784002 0784951	0785131 0791011 0790821 0790636 0792115	0792435 0792117 0792144 0792456 0785950	0790121 0790256 0790647 0791440	
I ATITUDE	8078	904 442 20 <b>6</b>	414810 413912 414016 414239 414410	414825 415222 415440 415746	414900 414535 414437 414912 414219	414000 413512 413732 413328 413803	414215 413435 413704 413231	
STATION NAME AND LOCATION	SIXMILE RN NR RIDDLESBURG, PA SHOUP RN NR SAXTON, PA GREAT TROUGH C NR CASSVILLE. PA WILLS C AT GLENCOE, PA	WILLS C NR HYNDMAN, PA GLADDENS RN NR HYNDMAN, PA LITTLE FISHING CREEK NEAR WHITE WILSON CREEK NEAR GRAGG N C SCAFFOLD LICK RN NR NORWICH, PA	SKINNER C AT PORT ALLEGANY, PA HAVENS RN AT NORWICH, PA W BR POTATO C AT BETULA, PA MILL BK AT COLEGROVE, PA ROBBINS BK AT CROSBY, PA	MARVIN RN AT SMETHPORT, PA E BR TUNGUNWANT C AT LEWIS RUN, PA MINARD RN AT CUSTER CITY, PA BENNETT BK AT BEADFORD, PA SUGAR RN NR SUGAR RUN, PA	CHAPPEL FK NR MORRISON, PA ELKHORN RN AT BUCHERS MILL, PA FARNSWORTH BR NR CLARENDON, PA MORRISON RN AT WARREN, PA PERRY MAGEE RN NR TIDIOUTE, PA	TIDIOUTE C AT TIDIOUTE, PA BEAVER RN AT ENDEVOR, PA E HICKORY RN AT QUEEN, PA L HICKORY RN AT WEST HICKORY, PA S BR TIONESTA C AT CHERRY RUN, PA	TWOMILE RN AT SHEFFIELD, PA BLUEJAY C NR LYNCH, PA UPPER SHERIFF RN NR LYNCH, PA THE BRANCH AT KELLETSVILLE, PA	
HYDROLOGIC Unit CODE								

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AIG3M		00000	00000	00000	00000	00000	00000	0000	
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SUSP DISCHARGE		7777	7777	77777	77777	77777	иииии	ииии	
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YTNUOD		053 053 053 121 121	121 039 123 123 039	039 039 039	121 121 121 121 121 121	121 085 121 121 121	047 047 047 053	065 053 031 031	
3TAT2		042 042 042 042	042 042 042 042	042 042 042 042	042 042 042 042	042 042 042 042	042 042 042 042	042 042 042 042	
LONGITUDE		0791930 0791944 0792825 0793232	0793351 0794158 0793244 0793449 0793649	0795107 0800634 0801015 0801312 0800300	0795719 0794739 0795222 0794757	0793831 0800530 0795523 0795027 0794320	0784045 0791711 0784103 0783917 0790713	0784652 0785936 0792305 0792706	
LATITUDE		4 13053 4 12624 4 12755 4 12828 4 12704	413205 413942 414236 414316 413756	414306 414531 413704 413523 413121	412558 413254 412952 412236 411900	411700 412107 412214 411518 411330	413620 411414 412957 412504 412725	411341 413057 411405 411404	
STATION NAME AND LOCATION		ROSS RN NR CRYSTAL SPRINGS, PA COON C NR NEWMANSVILLE, PA L TIONESTA C AT TIONESTA, PA STEWART RN AT BAUM, PA HEMLOCK RN AT PRESIDENT, PA	PITHOLE C NR LOVELL CORNERS, PA THOMPSON C NR HYDETOWN, PA CALDWELL C AT GRAND VALLEY, PA W BR CALDWELL C NR GRAND VALLEY, PA PINE C NR ENTERPRISE, PA	E BR MUDDY C NR KOOCHGEY CORNERS, PA GRAVEL RN NR WOODCOCK, PA VAN HRONE C AT KERRTOWN, PA WATSON RN AT WATSON RUN, PA L SUGAR C AT COCHRANTON, PA	MILL C AT UTICA, PA PRATHER C NR DEMPSEYTOWN, PA LAKE C AT COOPERSTOWN, PA LOWER TWO MILE RN AT VENANGO, PA E SANDY C NR KOSSUTH, PA	PINE RN AT NICKLEVILLE, PA MCCUTCHEON RN L SANDY C AT POLK, PA SCRUBGRASS C AT KENNERDELL, PA MILL C NR EMLENTON, PA	W BR CLARION R NR WILCOX, PA MILL C NR STRATTANVILLE, PA SILVER C AT WILCOX, PA ELK C AT DAGUSCAHONDA, PA W BR MILLSTONE C AT MARIENVILLE, PA	RATTLESNAKE C NR LANES MILLS, PA SPRING C AT DUHRING, PA TOBY C NR CLARION, PA DEER C NR SHIPPENVILLE, PA	
HYDROLOGIC Unit Code									

VIGH							
AIGEM	00000	0000	0000	0000	00000	00000	0000
NORDANIZATION 3000	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS USGS	USGS USGS USGS USGS
SUSP DISCHARGE	ииии	2222	7777	77777	77777	77777	NNNN
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STATION NAME AND LOCATION	PINEY C NR LIMESTONE, PA BEAVER C BELOW BLAIRS CORNERS, PA TURKEY RN AT ALUM ROCK, PA S BR BEAR C AT BRUIN, PA N BR BEAR C AT PARKER, PA	SUGAR C AT EAST BRADY, PA WOLF RN AT FALLS CREEK, PA FIVE MILE RUN AT BROOKVILLE, PA. WILDCAT RN AT DIAMOND, PA STUMP C NR BIG CREEK, PA	BIG RUN AT BIG RUN, PA CANOE C AT CLOE, PA SCRUBGRASS C AT GOSHENVILLE, PA N BR S FK PINE C AT ECHO, PA S BR S FK PINE C NR BRYAN, PA	N FK PINE C AT MOSGROVE, PA LIMESTONE RN AT TARRTOWN, PA COWANSHANNOCK C NR SUNNYSIDE, PA GLADE RN AT CADOGAN, PA CROOKED C ABOVE MCKEE RN AT CREEKSIDE, PA	S BR PLUM C NR GASTOWN, PA CHERRY RN NR BRICK CHURCH, PA WELLS C AT MOSTOLLER, PA BEAVERDAM C AT STOYSTOWN, PA QUEMAHONING C AT BOSWELL, PA	DARK SHADE C AT REITZ, PA L PAINT C AT SCALD LEVEL, PA S FK BENS C NR FERNDALE, PA BENS C AT FERNDALE, PA L CONEMAUGH R AT WILMORE, PA	HOWELLS RN NR EBENSBURG, PA S FORK AT SOUKSBURG, PA HINCKSTOWN RN AT MINERSVILLE, PA HENDRICKS C NR WEST FAIRFIELD, PA
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STATION NAME AND LOCATION	MCGEE RN AT BRENIZER, PA DUTCH RN NR BLUE GDOSE, PA ELK C NR BELSANG, PA BLACKLICK C AT VINTONDALE, PA BRUSH C AT CLAGHORN, PA	S BR TWO LICK C NR WANDIN JUNCTION, PA DIXON RN AT CLYMER, PA YELLOW C NR PIKES PEAK, PA L YELLOW C AT SUNCLIFF, PA AULTMANS RN NR LEWISVILLE, PA	LOYALHANNA C AT RECTOR, PA MILL C AT LIGONIER, PA FOURMILE RN AT DARLINGTON, PA CRABTREE C AT CRABTREE, PA WHITEHORN C NR SHIELDSBURG, PA	BLACKLEGS C AT CLARKSBURG, PA LONG RN NR MAYSVILLE, PA ROARING RN NR ORCHARD HILLS, PA BEAVER RN AT PAULTON, PA PINE RN AT WEST VANDERGRIFT, PA	ROUGH RN AT WEST WINFIELD, PA L BUFFALO C AT STLVERVILLE, PA L DEER C NR ACMETONIA, PA PLUM C AT VERONA, PA	GIRTYS RN AT BADERSTOWN, PA BIG SANDY CR AT WHARTON FURNACE CHAPEL, PA ( BIG SANDY CREEK AT ELLIOTTSVILLE, PA (11) MEADOW RN AT DAVISTOWN, PA MOUNTAIN RN AT RUBLE MILLS, PA	BROWNS RN AT RONCO, PA TEN MILE C NR AMITY, PA DANIELS RN NR MARIANA, PA N BR PIGEON C AT BENTLYVILLE, PA
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